NORTH AMERICAN COUNCIL OF AUTOMOTIVE TEACHERS

NACAT News

2021 NACAT Checklist:

- ☑ Share NACAT with **Students & Peers**
- ☑ Share & Attend **NACAT Virtual Training**
- ☑ Register for annual **Conference & Expo**

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Free Appropriate Public Education in the Time of COVID-19

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Abstract

In the spring of 2020, public schools across the United States were forced to close their campuses due to an emerging public health crisis caused by the detection of the first cases of the COVID-19 virus. Although schools closed their buildings, the delivery of educational services did not stop. This included the ongoing provision of services mandated by federal law under the Americans With Disabilities Act (ADA) and the Individuals With Disabilities Education Act (IDEA), which establish educational protections, processes, and rights for students with disabilities and their families to ensure educational equity. In this article, we describe the potential legal implications of COVID-19 for schools, students with disabilities, and their families with a focus on challenges faced in rural areas. Strategies for mitigating legal impacts are described.

In early March 2020, an extremely contagious novel coronavirus, first detected in late 2019 in Wuhan, China, had spread into a global pandemic. Although it is still unclear when COVID-19 began widespread community transmission in the United States, by April 6, 2020, every state had mandated the closure of public school campuses. With the exception of a small number of rural schools in Montana who began opening schools at the discretion of local school boards on May 7, 2020, almost all of these closures were extended through the end of the academic year. Yet, these campus closures were not a complete shutdown of education. Many schools began operating remotely and a nationwide transition to the remote delivery of instruction was initiated. Through a variety of delivery modalities, teaching and learning continued along with student support services and administrative operations. This necessitated increasing access to technology and broadband internet services to ensure equity and included large-scale efforts to address urban and rural disparities in these critical areas. Public schools faced an additional challenge as, without federal guidance, it was still unclear what schools were required to provide in relation to the federal special education requirements in the time of a pandemic. To provide this guidance, on March 12, 2020, the U.S. Department of Education (USDE) issued a statement relating to remote learning and reaffirming the importance of meeting the mandates of the Individuals With Disabilities Education Act (IDEA, 2004) in this new remote learning context:

Continued on Page 8

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GM'S "EVERYBODY IN" USHERS IN NEW BRAND IDENTITY

As GM amplifies its EV message, it has also created a revitalized brand identity designed for a digital-first environment. The new logo builds on a strong heritage while bringing a more modern and vibrant look to GM's familiar blue square. The new brand identity extends to technology brands including Ultium. The team of GM designers tasked with creating the new logo considered how to balance the history and trust inherent to the existing design with GM's vision for the future.

GM describes the new logo as:

- Featuring a color gradient of vibrant blue tones, evoking the clean skies of a zero-emissions future and the energy of the Ultium platform.
- Creating a more modern, inclusive feel through rounded edges and lower-case font.
- Connecting to the previous GM logos as well as visually representing the Ultium platform via the underline of the "m".
- Providing a nod to the shape of an electrical plug within the negative space of the "m".

There are three versions of the logo.

BOARD CHAIR

STEVE GIBSON

RIVERSIDE, CALIFORNIA

Hello again, and Happy New Year! I think I share everyone's opinion that I am anxious to see what this year is going to be like. After 366 days filled with so much uncertainty, I am grateful for everything that went "right" in 2020. First, as some of you have heard, I started a new job at the end of November. I am working for S&B Filters (yes, they are a competitor of my former employer) and oversee technical development and training. I am delighted to be working in the automotive industry again and in a role where I can train our personnel and help the company run more efficiently. I am also grateful for all of you – my network of contacts I have made over the years. My personal network is responsible for finding my new position and getting me an interview. I could not be more thankful, and for me, it really showed the importance of networking and building your personal brand. And while 7 months and 27 days of unemployment might seem like a long time, I am thankful for that time of reflection, learning, and growth because I am stronger now than I was before. What things from 2020 are you grateful for?

As the NACAT Board looks ahead to 2021, we will be continuing our online mini-conferences and instructor roundtables. We have some great topics and presenters picked out, but if you have any ideas for training or group discussion you would like to suggest, please let myself or any NACAT Board Member know! We want to make sure you get the most of the training we provide, and what better way to accomplish that than tailoring our seminars to the topics you feel are most important.

The rescheduled 2020 NACAT Conference is still penciled in on the calendar for July 12-15, 2021. The NACAT Board is closely monitoring potential setbacks which could affect the conference. Most notably, the Board is aware that many schools still have travel restrictions in place as well as holds on funding for in-person professional development. Time will tell if these factors will present issues to the NACAT Conference, but if something changes, we will let you know immediately.

Finally, while working in the garage recently, I came upon an example I wanted to share with you. When faced with a problem, there may be many solutions to choose from. Not all solutions are good solutions. The solution you choose may work for now, but will it cause an issue down the road? Is your solution a short term fix that causes a much worse long term problem? Choose your path carefully.

Best wishes for a great year.

Proactive vs. Reactive Car Driving: EEG Evidence for Different Driving Strategies of Older Drivers

By: Melanie Karthaus , Edmund Wascher, and Stephan Getzmann

Citation: Karthaus M, Wascher E, Getzmann S (2018) Proactive vs. reactive car driving: EEG evidence for different driving strategies of older drivers. PLoS ONE 13(1): e0191500. https://doi.org/10.1371/journal.pone.0191500

Abstract

Aging is associated with a large heterogeneity in the extent of age-related changes in sensory, motor, and cognitive functions. All these functions can influence the performance in complex tasks like car driving. The present study aims to identify potential differences in underlying cognitive processes that may explain inter-individual variability in driving performance. Younger and older participants performed a one-hour monotonous driving task in a driving simulator under varying crosswind conditions, while behavioral and electrophysiological data were recorded. Overall, younger and older drivers showed comparable driving performance (lane keeping). However, there was a large difference in driving lane variability within the older group. Dividing the older group in two subgroups with low vs. high driving lane variability revealed differences between the two groups in electrophysiological correlates of mental workload, consumption of mental resources, and activation and sustaining of attention: Older drivers with high driving lane variability showed higher frontal Alpha and Theta activity than older drivers with low driving lane variability and—with increasing crosswind—a more pronounced decrease in Beta activity. These results suggest differences in driving strategies of older and younger drivers, with the older drivers using either a rather proactive and alert driving strategy (indicated by low driving lane variability and lower Alpha and Beta activity), or a rather reactive strategy (indicated by high driving lane variability and higher Alpha activity).

Introduction

Aging is associated with changes in perceptual, motor, and cognitive functioning [1]. Even in healthy aging these changes may have an impact on everyday behavior, especially on complex tasks like driving a car in dense traffic environments [2]. According to Anstey et al. (2012) [3], vision and cognitive factors explain up to 83–95% of age-related variance in driving ability. Cognitive factors comprise slowing in response speed [4], problems in dividing and switching of attention [5, 6], declines of performance in dual- or multitask situations [7], and deficits in inhibition of irrelevant stimuli and of inappropriate responses in the driving context [2, 8]. These impairments are even enhanced under time pressure or in very complex and unpredictable situations [9]. Turning to one's left, driving on busy roads, and crossing intersections are typical examples of such difficult driving situations. Accident analysis and statistics from different countries confirm these results: Most crashes caused by elderly drivers are the consequences of ignoring the right of way (especially at intersections), and of incorrect (left) turns and lane changes [10, 11].

Continued on Page 11

Continued from Page 3

If a [local educational agency, typically a school district (LEA)] continues to provide educational opportunities to the general student population during a school closure [i.e., by providing online learning], the school must ensure that students with disabilities also have equal access to the same opportunities, including the provision of [free appropriate public education (FAPE)]. (34 CFR §§ 104.4, 104.33 (Section 504) and 28 CFR § 35.130 (Title II of the ADA)). [State Educational Agencies (SEAs)], LEAs, and schools must ensure that, to the greatest extent possible, each student with a disability can be provided the special education and related services identified in the student's [individualized education program (IEP)] developed under [the Individuals with Disabilities Education Act (IDEA)], or a plan developed under Section 504. (34 CFR §§ 300.101 and 300.201 (IDEA), and 34 CFR § 104.33 (Section 504)).

If a child does not receive services during a closure, a child's IEP team (or appropriate personnel under Section 504) must make an individualized determination whether and to what extent compensatory services may be needed, consistent with applicable requirements, including to make up for any skills that may have been lost.

The equitable provision of educational services for all students is at the forefront of this guidance. Unfortunately, some state education agencies (SEAs) and local education agencies (LEAs) interpreted this to mean that schools should not offer remote learning opportunities for any students due to their perceived inability to meet the requirement of the Americans With Disabilities Act (ADA) and the IDEA. As a result, numerous public school students with and without disabilities were not receiving any educational services (Nadworny & Kamenetz, 2020). This prompted the Office of Civil Rights (OCR), the Office of Special Education and Rehabilitative Services (OSERS), and the USDE to issue a memo of clarification to SEAs and LEAs on March 21, 2020. The memo indicated,

A serious misunderstanding . . . has recently circulated within the educational community. As school districts nationwide take necessary steps to protect the health and safety of their students, many are moving to virtual or online education (distance instruction). Some educators, however, have been reluctant to provide any distance instruction because they believe that federal disability law presents insurmountable barriers to remote education. This is simply not true.

To be clear: ensuring compliance with . . . [the ADA and IDEA]. . . should not prevent any school from offering educational programs through distance instruction.

This clarification also provided suggestions to schools as to how they might provide special education accommodations and services in online or other remote formats. The USDE (2020) suggestions included "extensions of time for assignments, videos with accurate captioning or embedded sign language interpreting, accessible reading materials, and many speech or language services through video conferencing" (p. 2). Finally, on April 27, 2020, the USDE Secretary Betsy DeVos clearly stated that the USDE "is not recommending Congress pass any additional waiver concerning the Free Appropriate Public Education (FAPE) and Least Restrictive Environment (LRE) requirements of the IDEA, reiterating that learning must continue for all students during the COVID-19 national emergency" (p. 1).

The expectation was clear. Given some reasonable period of time for the development of a remote learning plan which protects the safety and equity of students and educational service providers, all LEAs would be obligated to provide a free appropriate public education (FAPE) as described by the services and goals/objectives outlined in a student's IEP (Individualized Education Program).

Continued on Page 9

Article: FAPE

Continued from Page 8

At the center of this is the core legal principle that LEAs cannot simply ignore the academic and individualized support needs of its most vulnerable populations that are protected under federal law. Times of national crisis are not the time to roll back critical civil rights protection. The foundations of these substantive and procedural provisions in the IDEA are built upon the concept of FAPE (and specifically what is an appropriate education) and of the IEP (and 504 plans for students with services provided under the ADA) as a mechanism to ensure IDEA compliance and equitable access to educational supports and services. These important components are described in more detail below.

The Critical Legal Concepts for COVID-19

FAPE and the IEP

The concept of FAPE is the cornerstone of IDEA and our nation's special education law. IDEA asserts that each eligible child with a disability is entitled to a FAPE. It is defined in IDEA (34 CFR §300.17) as an educational program that is individualized to fit the specific needs of a child having a disability or qualifying for special education services. The program must meet the child's unique needs, provide access to the general education curriculum, and meet state grade-level standards. FAPE emphasizes the importance of special education and related services designed to meet the child's unique needs and that prepares the child for further education, employment, and independent living. Most importantly for this discussion, FAPE requires special education and related services

Continued on Page 12

PRESIDENT

CURT WARD

JOLIET JUNIOR COLLEGE

As I compose this update, the fall semester has come to a close and the grades have been recorded. Much like most of you, I found this past semester to be one of the most challenging of my teaching career. The combination of remote and hybrid learning has forced us to become very creative and innovative as we work to prepare our students to enter the workforce.

The national health emergency continues to alter the way we live our lives. During this time many businesses and organizations have had to adapt, and this includes NACAT. As everyone is already aware, we had to cancel our 2020 NACAT Conference and Expo due to the ongoing health risks and the limitations imposed by the state and local governments. Instead NACAT hosted a one-day virtual conference on July 23rd. All four online sessions were well attended and it was a huge success. Thank you to the many NACAT members who were in attendance. We also had many non-members in attendance. These instructors got an opportunity to what NACAT was all about and hopefully we will see them at an in-person event soon.

Since July, NACAT has hosted two instructor roundtable sessions. Each roundtable discussion covered a non-technical topic. The first session was a discussion on “What Has Gone Well” as the new school year kicked off in August and September. The second session was a discussion on “The Challenges of Placing Our Students with Employers”. Both sessions were well attended and provided some good information and insight. Thank you to the Board members and officers who helped to make these events possible and thank you the members who provided input on each topic.

In January, NACAT will continue to host online events. We will have a third instructor roundtable discussion and we will host a technical session. The roundtable will be a discussion of “Effective Technology and Techniques uUsed to Convey Classroom Information Remotely”. The technical session will feature a presentation on “adding hybrid and electric vehicle technology to the curriculum”. Each of these sessions will be on a Thursday evening and begin at 7:00 pm central time.

The Board and officers are continuing to work together to bring you the best possible NACAT. Our goal is to serve you, the educator, in the most effective manner. If you have not done so, visit our new updated website. Look for emails in early January and plan to be a part of the online roundtable and technical sessions as we move forward into the new calendar year.

Finally, enjoy the holiday season. Enjoy time with family and friends (following socially distancing guidelines) as you recharge your educational batteries for the upcoming semester. Have a great spring term, no matter what the format, and know that you are making a positive impact on the automotive technicians of the future.

Continued from Page 7

In addition to a general age-related decline, aging is also associated with an increase in inter-individual variability in cognitive performance [12]. This increase is based—at least in part—on the use of different strategies for compensating age-related declines in functioning, as supposed by the so-called decline-compensation hypothesis [13]. Effective compensation strategies may therefore explain why—despite a general trend of an age-related decline—some studies did not find any differences in driving performance between younger and older drivers [14, 15]. In fact, there is a large variance within the group of older drivers, and only a small percentage of them shows an increased risk of accidents. Many, but not all of those drivers have deficits in basic vision (e.g. due to eye diseases [16]) or preclinical or early stage of dementia [17]. The risk of accidents is also increased in drivers, who are at least 75 years old, and who drive less than 3000 km per year [18]. However, the vast majority of elderly are safe drivers [19], who show no noticeable driving problems, neither in real life, nor in experimental driving simulator settings.

On the other hand, subtle differences in driving competence and driving strategies between older drivers may not become manifest in overt performance. A potential method for exploring the underlying cognitive processes of more or less successful car driving are neurophysiological measures. The electroencephalogram (EEG) allows the exploration of human information processing and cognitive functioning at a very high time resolution in situations, where no overt performance can be measured. One well-established method is the analysis of oscillatory brain activity, with the frequency bands of the EEG reflecting different mental processes of perception and cognition: In the present context, three frequency bands are of particular interest, the Alpha, Theta, and Beta bands. Oscillations in Alpha band (8–13 Hz) are most evident at posterior regions of the head, and are traditionally associated with mental fatigue [20]. However, some studies showed a decrease of Alpha activity with increasing task complexity [21]. It has therefore been supposed that posterior Alpha activity reflects a mental state of boredom or withdrawal of attention, rather than mental fatigue [22, 23]. The frontal Theta activity (4–7 Hz) is associated with mental activity and cognitive control, for example, in reinforcement learning tasks (e.g. [24]; for a review see [25]). Theta activity increases continuously in long-lasting monotonous tasks [26, 27], and therefore seems to reflect the consumption of mental resources with time on task. Finally, Beta activity (> 13 Hz), traditionally associated with sensorimotor functions (for review, see [28]), has also been related to cognitive processing and mental workload [29]. Taken together, the pattern of activity in these frequency bands reflect different mental states that, in turn, may result in different behavioral outcomes.

The present study used these brain oscillatory measures to explore the cortical basis of inter-individual differences in driving performance and driving strategies of younger and older drivers. A one-hour monotonous driving scenario was used, in which the participants had to keep a vehicle on the lane and to countersteer, when crosswind (of different strength) came up to move the car off the road [23]. The underlying mechanisms of high driving abilities were studied by post-hoc subdividing the group of older participants into a high-workload (Old-High) and a low-workload (Old-Low) group. The individual mental workload of compensating crosswind was operationalized by the variability of driving lane, as proposed by Verwey and Veltman (1996) [30]. The subdivision into an Old-High and Old-Low group was based on the assumption that a higher variability of driving lane (indicated by a higher steering activity) should reflect a higher effort of crosswind compensation and, in turn, higher driving workload. A study with young drivers indicated large inter-individual differences in driving lane variability [31], and pilot studies revealed that this was especially true for older drivers, suggesting differences in the amount of mental workload in demanding driving situations.

Continued on Page 18

Article: FAPE Continued from Page 9

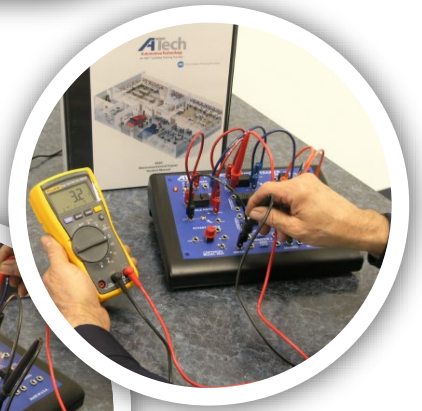
that are provided in conformity with an IEP that meets the requirements of §300.320 through §300.324 of the IDEA. School districts are considered to be in compliance with the FAPE provisions if the IEP enables the child to achieve meaningful educational progress. It is important to be aware that the definition of meaningful educational progress was being examined through a new lens prior to the COVID-19 national emergency, and the bar had already been raised on what meaningful educational progress constitutes a FAPE.

This change began in 2017, when the United States Supreme Court issued a unanimous opinion in *Endrew F. v. Douglas County School District* (Re-1, 137 S. Ct. 988). In this case, the Court interpreted the scope of the FAPE requirements in the IDEA. The Court overturned the decision of the United States Tenth Circuit Court of Appeals (Tenth Circuit) that Endrew, a public school student with autism who had made almost no progress on his IEP goals, was only entitled to an educational program that was calculated to provide merely more than de minimis educational benefit (i.e., The Rowley Standard). The Supreme Court rejected the Tenth Circuit's reasoning and ruled that, to meet its substantive obligation under the IDEA, a school must offer FAPE as the intended outcome of a well-designed IEP and moved the bar for "meaningful progress" to be one rooted in demonstrated progress in grade-level academic content. In addition, there is a particular emphasis on parental involvement in defining the individualized educational outcomes through the IEP process. This evolving definition will become an important aspect in determining whether LEAs are meeting the substantive provisions of the IDEA in the time of COVID-19.

COVID-19 Related Court Cases

Two court cases, both filed on May 19, 2020, relate to the impact of COVID-19 on the education of students with disabilities. They can be used to highlight the critical tensions that are defining FAPE in the time of COVID-19. *Brennan and James v. Wolf, Rivera, and the Pennsylvania Department of Education* is a class action lawsuit brought on behalf of verbal and nonverbal students with autism

Continued on Page 14



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NACAT MINI CONFERENCE

TUESDAY JANUARY 19, 2021

7:00 - 8:30PM CST

ELECTRICAL TESTING STRATEGIES FOR LOW AND HIGH VOLTAGE CIRCUITS

PRESENTER: JOHN FORRO

AVI instructor John Forro walks you through the practical ins and outs of low and high voltage electrical theory. There is lecture and examination of electric vehicle components. Forro shows the proper testing and service proceduresinvolved with traditional 12 volt systems and the newer high voltage components found in electric vehicles. High voltage components coveredin this course include the HV battery pack, inverter assembly, converter assembly, electric air conditioning compressor, andmotor generators 1 and 2. A heavy emphasis will be placed on safety as well as real-world applications of testingand repair procedures.

John Forro has achieved ASE Master certified automobile technician with L-1 Advanced Engine Performance certification. John has authored 20 automotive manuals to date, produced several automotive training videos, appeared in many of the industry trade magazines and won the Motor Top 20 tool award for Silver Bullets. John has been featured in several of the Automotive Video Inc. training films on such subjects as Silver Bullets, Quick Check Diagnostics and Mode $06. You have read John's articles in the industry trade magazines such as Under Hood Service, Brake and Front End and Tech Shop. John continues to be a working automotive instructor and technician, which enables him to relate well with technicians and instructors. John has taught for several of the industry's leading companies and provided emissions training for Ohio, Pennsylvania, Michigan, Indiana, Illinois, Wisconsin, Maryland, New York, Nevada, California, Florida, Hawaii, Missouri, New Jersey, South Carolina, and North Carolina. John is extremely proud of his reputation for providing excellent training classes and course materials.

Article: FAPE Continued from Page 12

who use augmentative and alternative communication (AAC) and who are educated in public schools with a teacher to student ratio of not less than one teacher or aide per two students (both Brennan and James had 1:1 staffing ratios). This lawsuit charges that the Governor, Secretary of Education, and the Pennsylvania Department of Education failed to provide the plaintiffs with FAPE. Specifically, the case asserts that the Governor failed to identify special education services as "life sustaining" and closed schools. In doing so, schools were left unable to provide FAPE because the limitations of remote learning resulted in the plaintiffs not having their educational needs met "as adequately as the needs of non-disabled children" (p. 12). The case highlights services described in the IEP as critical components of FAPE. The amount of service provided (the plaintiffs went from getting 32.5 hr of week of service in a brick and mortar setting to 1.25 hr per week in the remote learning environment) is an important part of the IEP which requires a description of "the anticipated frequency, location, and duration of . . . services" (20 U.S.C. §14.4(d)(1)(A)(i)(VII)). Changes in the amount of services provided without following the process to review and revise the IEP was in violation of FAPE under IDEA. In addition, the case asserts that the 1:1 staffing ratio is an IEP accommodation that was not being provided, and that students in the plaintiff classes often required "hand over hand" instruction where a trained special educator physically prompts and assists them to complete a task and that this support was "literally impossible to achieve with [remote] education" (p. 18). Finally, the suit also charges that the plaintiffs "have reverted to a lower level of functioning as evidenced by a measurable decrease in skills or behaviors as a result of the closure of schools" (p. 19), and that there was no plan for extended school year (ESY)

Continued on Page 17

VOLVO CARS IMAGINES THE FUTURE OF AUTONOMOUS DRIVE BY TAPPING INTO ORIGINS OF HUMAN COMMUNICATION

Volvo Cars has established itself as one of the leaders in autonomous drive development, following its announcement earlier this year that its next generation of cars will be available as hardware ready for the technology from production start.

At the same time, the company is also looking further into the future, considering how autonomous cars will communicate with other road users in a driverless world. This research looks beyond current Highway Pilot plans, which aims to have cars drive safely on their own on chosen areas of highway that Volvo has verified as safe. To design this future, however, Volvo's experts are seeking inspiration from the past.

"We make no secret about the fact that we see autonomous drive as the real long-term solution to avoid car accidents and to achieve traffic safety," says Mats Moberg, Senior Vice President of R&D at Volvo Cars. However, as is always the case at Volvo Cars, safety is the first concern.

The Volvo 360c autonomous concept car, unveiled in 2018, provides one possible avenue of future development. It explores the type of safety-focused communication Volvo Cars believes will be essential to cars of the future when it comes to sharing the road with other road users, including other vehicles, cyclists and pedestrians. The design for the 360c explores a combination of external sounds, lights, and even subtle movements to communicate the vehicle's intentions to other road users.

While the Highway Pilot will only be available on highways verified safe, when future autonomous cars eventually enter environments shared with pedestrians, cyclists and other road users, the vehicles will need to navigate all these complexities on their own. Although the communication is intended for highly advanced cars that won't be realised for years to come, the inspiration behind it is simple and age-old: the human body language.

"What we're really after is to give the self-driving car a type of body language that everyone understands," says Mikael Ljung Aust, Senior Technical Leader for Collision Avoidance Functions at the Volvo Cars Safety Centre.

"If you want to set up a global standard for communication, there are some basic ground rules you need to follow. One, you need to speak a language that everybody understands, otherwise it isn't global. Two, it needs to be fairly quick. You can't have any uncertainties in traffic situations."

Inspired by aspects of such universal human communication, Volvo is investigating sounds which aim to indicate an autonomous car's intentions to other road users.

"What we really need is three or four key sounds that tell you what the car is going to do," says Ljung Aust. "One of these sounds is informing the driver or the pedestrians around the car what its intentions are, for example: 'I do not intend to move'."

"For this, we use a low frequency sound, one we as humans naturally associate with something big. It's a pulse, oscillating very slowly, which indicates the car is standing still."

This intuitive approach has also inspired the acceleration and deceleration sounds being proposed by the 360c, which consist of a soft ticking that gradually increases and decreases in frequency respectively.

Continued on Page 16

RELEASE: VOLVO

CONTINUED FROM PAGE 15

For a sound that warns a pedestrian of an oncoming car, Volvo was inspired by a technology used in submarines. The company is researching a new technology that uses ultrasounds via parametric speakers to "ping" pedestrians and cyclists with a noise only they can hear, similar to a submarine's sonar.

However, as with most human communication, sound is most effective when accompanied by a synchronized visual display. Volvo Cars thus is looking into the possibilities of replacing the eye-to-eye acknowledgement of driver and other road users using contextual lights on the car.

On the 360c concept car, this is visualised by a light band wrapped around the car's sides. The band lights up to alert other road users that they have been "seen" by the car and are thus taken into account by its safety systems. The same light band synchronises with the car's sounds to safely and clearly communicate its intentions.

"There is an almost behavioral or ancestral reflex in people that make them jump or at least alert themselves if things happen in two channels at the same time," says Ljung Aust. "Thunder and lightning is an easy example."

While this technology is in the developmental stages, it's all part of Volvo Cars' efforts to create the safest traffic situations possible. By tapping into a combination of movement, sounds and light – non-verbal communications that have been so deeply ingrained in humans for tens of thousands of years – Volvo Cars hopes to make the intentions of autonomous cars to be understood quickly, safely and universally in years to come.

Continued from Page 14

services as required by the IEP. In essence, by failing to provide the services, supports, and accommodations outlined on students' IEPs, public schools were failing to provide a FAPE to students with disabilities.

In the second case filed, the *Chicago Teachers Union v. Betsy DeVos; United States Department of Education; the Board of Education of the City of Chicago*, the plaintiffs assert that the Secretary of the USDE, the USDE, and the Chicago Board of Education violated Section 706 of the Administrative Procedure Act (APA) when they withheld a waiver of IDEA regulations (5 U.S.C. §706(1)). They argue that in Section 3511(a) of the Coronavirus Aid, Relief, and Economic Security (CARES) Act, Congress gave Betsy DeVos the authority to waive any regulation under the IDEA or Section 504 of the ADA "if the Secretary determines that such a waiver is necessary and appropriate due to the emergency . . . with respect to COVID-19" (p. 7). By failing to exercise this authority, the suit claims that DeVos acted "arbitrarily and abused her discretion . . . by failing to waive any requirement to redraft tens of thousands of educational plans under [IDEA 34 C.F.R. §300.324(b)(1)(ii)]," the regulations related to reviewing and revising the IEPs for students with disabilities. As a result, Chicago public school teachers would be required to review and revise over 60,000 educational programs and their efforts would be diverted from the "work of teaching and providing services, and as such [would] likely deprive their students of FAPE required by the IDEA" (p. 7). In essence, this case argues that the Chicago teachers did not have the time to transition to remote learning and to review and revise all the IEPs to reflect these changes. Reviewing and updating the large number of IEPs would cause such an administrative or procedural burden that teachers would be unable to provide teaching and supports and would fail to provide FAPE for students with disabilities. Again, the IEP is highlighted as critical in determining the FAPE for students with disabilities.

Both of these court cases focus on the delivery of FAPE and the central role the IEP plays is assuring compliance with the federal law. The IEP is increasingly looked to as the mechanism for students with disabilities to determine what an individual's FAPE would look like. LEAs need to pay particular attention to the content and process of IEPs as COVID-19 has created an environment where substantive and procedural violations of IDEA are likely to occur. Although the IDEA's procedural protections are largely contained in the statute, its substantive provisions are generally not well defined and have largely been developed through the courts (e.g., the *Endrew Standard*). A substantive violation arises under the IDEA where the content, such as the educational services contained in the IEP, is insufficient to afford FAPE. Courts have generally viewed IDEA violations as substantive when they involve (a) IEP compliance, (b) the least restrictive learning environment, or (c) the adequacy of the individualized instructions and educational supports contained in an IEP. *Brennan and James v. Wolf* illustrates some of the issues LEAs face in meeting these substantive requirements and providing FAPE in the time of COVID-19.

In contrast, procedural violations occur when an LEA fails to comply with the process-based requirements described in the IDEA. Courts have typically viewed failures to properly carry out the processes for identifying students with disabilities and developing IEPs as procedural violations. More specifically, violations regarding Child Find (i.e., failure to identify students eligible for special education services), and evaluations (discussed in a subsequent section) and violations involving the specific processes for developing IEP services, supports, and goals are viewed as procedural violations. There are several types of protections that apply to the process of developing an IEP, including (a) requirements that parents be involved in the process, (b) that IEP teams have a proper composition, (c) that parents receive notice of changes to an IEP, and (d) that the IEP process be undertaken in a defined period of time. Failure to comply with these protections are typically

Continued on Page 22

Continued from Page 11

To investigate the neural correlates of driving workload, the oscillatory activities of the Old-High and Old-Low groups were contrasted: Significant differences in Alpha, Beta, or Theta power would indicate differences in mental fatigue, consumption of mental resources, and mental workload, respectively. In the theoretical framework of a driving task, Garcia et al. (2017) [32] recently proposed two different driving states, a proactive state in which the brain anticipates and actively plans the responses to sensory driving information, and a rather reactive state in which the brain reacts to environmental information. The proactive state is characterized by a strong activity in the Beta and Delta bands, while the reactive state is characterized by activity primarily within the alpha band. In the present study, it was therefore hypothesized that a proactive driving state should be associated with a low driving lane variability in combination with a strong Beta and fronto-central Theta activity in the low-workload group. In contrast, a reactive driving state should be associated with a high driving lane variability and a strong posterior Alpha activity in the high-workload group. Finally, age-related differences in driving workload were explored by comparing the Old-Low group with the group of younger participants (Young). Here it was expected that low-workload older drivers use different (potentially compensating) driving strategies than younger ones. Such compensation in driving strategies should be reflected by additional brain activity in Theta and/or Beta band in the Old-Low group relative to the young group.

Materials and Methods

Participants

All subjects provided informed written consent and all experimental procedures were approved by the local ethics committee of the Leibniz Research Centre for Working Environment and Human Factors. The sample consisted of 14 younger (mean age = 25.1, SD = 2.7; range 20–31 years; 7 women) and 28 older participants (mean age = 64.6, SD = 3.7; range 56–70 years; 12 women). The younger participants (driving license since 6 years on average) were mainly recruited from local colleges and universities, and the older participants (driving license since 45 years on average) were recruited by regional newspaper advertisements. All participants were experienced drivers, using a car at least twice a week in the last three years. They reported no history of any neurological or psychiatric disorder and no consumption of substances that may affect the central nervous system. All of them had normal or corrected to normal vision and hearing and did not show any signs of simulator sickness during testing. They provided informed written consent prior to entering the experiment and received up to 30 € for their participation. The study complied with the tenets of the Declaration of Helsinki.

Procedure and Stimuli

The experiment took place in a static driving simulator (ST Sim; ST Software B.V. Groningen, NL; **Fig 1A**). The participants had to drive at a constant speed of 31 mph on a monotonous straight two-lane road through grassland. There were no bends or any other visual distraction on the road.

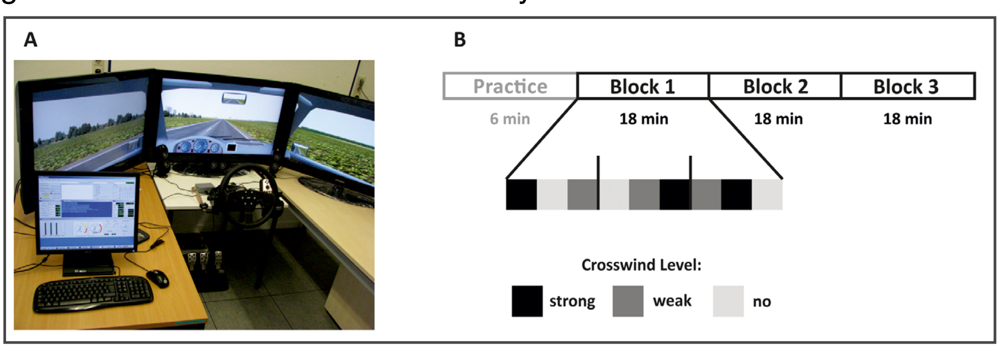

Figure 1. Experimental design. *(A) Experimental environment with driving simulator configuration and (B) task set-up with one initial practice block followed by three experimental blocks. Each experimental block consisted of nine segments with three different crosswind levels.*
https://doi.org/10.1371/journal.pone.0191500.g001

Continued on Page 21

Written By Curt Ward

LESSON 1: HIGH VOLTAGE SAFETY

Once you make the decision to add hybrid and electric vehicles to your curriculum, the first question you may ask is where do I start? The answer is easy; start with safety. This article will focus on what needs to be covered as we start working on the vehicle.

Let's begin with something you probably didn't think of; students with electronic medical devices. This condition is more common than you might think. Electronic medical devices include cardiac pacemakers and cardioverter defibrillators. Students who rely on cardiac pacemakers should not service or repair electric or hybrid electric vehicles because of strong magnetic fields. Students who rely on implanted cardiac pacemakers or implanted cardioverter defibrillators should check with the manufacturer of the device before being in or around a charging vehicle.

The first on-car safety concern is the ability to identify high-voltage systems. High-voltage components are identified with warning labels. High-voltage cables are identified by color of the plastic conduit and include:

- Blue or yellow. Up to 60 volts (not a shock hazard but an arc will be maintained if a circuit is opened)
- Orange. Above 60 volts

The orange cables will be the most common, however, it is not uncommon to find blue or yellow cables associated with electronic power steering systems. Follow all precautions when working on or near high voltage wiring or components. An instructor led walk-around or a student component identification worksheet is a great way to emphasize these systems.

Before working on the high-voltage system of a hybrid electric vehicle, be sure that high-voltage lineman's gloves are available. Be sure that the gloves are rated at least 1,000 volts and class "0" by ANSI/ASTM. The American National Standards Institute (ANSI) is a private, nonprofit organization that administers and coordinates the U.S. voluntary standardization and conformity assessment system. A great hands-on activity is to have your students measure their own hands and determine the correct glove size. The students really enjoy this activity. As one student commented, "I did not know gloves came in specific sizes. I have only seen small, medium, large and extra-large at the local retail store."

If you do not already have them in inventory, it may be necessary to purchase some additional tools. All multi-meters used on a hybrid or electric vehicle need to be CATIII rated. This also includes the meter leads. Most multi0meters that meet this standard will be labeled and easy to identify. If you are not sure, consult the manufacturer's information. Other tools may need to be purchased depending on the tasks you want to accomplish; however, the cost of the tools is not likely to be a roadblock in adding this topic to your class.

When hoisting or using a floor jack, refer to the manufacturer's service information for proper lift points.

Continued on Page 26

Article: EEG

Continued from Page 18

While driving, the participants had to stay accurately with the vehicle on the right lane. To simulate weak and strong crosswind, the slope of the road varied as a function of lateral force of several sine waves (1/25.6, 1/17, 1/12.8, 1/10.2, 1/8.6, 1/7.2, 1/6.4, and 1/5.6 Hz). The sine waves consisted of eight different superimposing and phase-delaying sinusoid signals, and the resulting lateral force was unpredictable for the participants. There were three different crosswind levels (no, weak, and strong with the amplitude of the strong crosswind being twice that of weak crosswind). The crosswind varied every two minutes. Before each 2-minutes segment short transfer-intervals (duration 1 sec) were introduced to avoid artificial changes in crosswind level. During the experiment auditory stimuli consisting of harmonic tones of different frequency (duration 100 ms, interstimulus-onset interval 1000 ms, intensity 65 dB) were presented. The cortical responses to these tone stimuli were the topic of a different study that was not relevant here. The participants could therefore ignore the tones. The experiment started with a practice block in which the participants became familiar with the task. Then three experimental blocks each with nine segments had to be performed (see **Fig 1B**). The driving task was performed without any break or interruption and lasted 60 minutes.

Data Recording

While driving, the EEG (biosemi active system, Active two, BioSemi, NL) was recorded from 64 scalp electrode sites. EEG electrodes were arranged on the basis of the International 10–10 system and two additional electrodes were placed on the left and right mastoids. The Biosemi's Active Two

Continued on Page 23

Continued from Page 17

construed as procedural violations. Both the *Brennan and James v. Wolf* and the *Chicago Teachers Union v. USDE* cases highlight the critical procedural components of the IEP process as being central to the delivery of FAPE in the time of COVID-19. They also illustrate the very real challenges faced by LEAs in meeting the substantive and procedural components of FAPE in the face of a national emergency no one was prepared for. The remainder of this article will outline some of the challenges LEAs face in light of these FAPE requirements with a focus on challenges that are unique to rural and remote schools. We also discuss potential solutions, considerations, and necessary changes for the future to ensure FAPE and promote equity in our educational systems.

Challenges Facing Rural LEAs

Several challenges emerged as LEAs moved to provide remote educational services for all students following the physical closure of schools during the COVID-19 pandemic. News sources and preliminary research reports suggested these challenges were being addressed in different ways and with varying degrees of success in different areas of the United States. LEAs within rural and remote communities faced additional difficulties, especially as they worked to provide FAPE for students with disabilities.

One challenge confronting LEAs throughout the country since the early weeks of school campus shutdowns was the distribution of and access to technology resources for educators and students to support remote instruction and learning. LEAs had to quickly ensure that educators could deliver remote instructional services for students from their homes or other off-site locations. These efforts often included providing hardware and software resources for staff (i.e., cameras, microphones, computers that could be used remotely, video-conferencing software, instructional software), and attempts to ensure that educators had access to a high-speed internet connection from off-campus locations. At the same time, LEAs needed to consider technology access for students within the communities they served. Just as educators needed hardware, software, and internet connectivity resources to deliver instruction, the students living within LEA communities needed these resources to receive instruction from their homes or other off-campus locations.

A technology gap, or "digital divide," between non-rural and rural schools and communities in the United States has persisted for decades and has been particularly highlighted during school campus closures. Compared with Americans living in urban or suburban areas of the country, Americans living in rural communities are notably less likely to own a home computer (e.g., desktop or laptop), own a smartphone, or have broadband internet in their homes (Perrin, 2019). Recent studies have found that in rural communities, 24% of adults reported having a major problem accessing the internet with another 34% reporting at least minor difficulties, suggesting that over half of individuals in rural communities have some difficulty accessing the internet (Parker et al., 2018). These disparities have been attributed both to a lack of community broadband internet infrastructure in rural areas (Levin & Mattey, 2017) and to the comparatively reduced economic resources in these communities (Rideout & Katz, 2016). Although high-speed internet connectivity and access to digital devices for educators and students have been noted issues for LEAs throughout the country during the physical school closure (Dusseault & Pillow, 2020; Editorial Board, 2020), students in rural communities remain particularly vulnerable to the loss of timely and appropriate educational services (Gross & Opalka, 2020).

Many areas of the United States were not able to provide high-quality technology access for rural communities during the school closures and instead relied on low-tech or no-tech instructional delivery systems. News sources reported that some rural educators provided educational services

Continued on Page 28

Article: EEG Continued from Page 21

amplifier uses a 2-wire active electrode system with a Common Mode Sensing and Driven Right Leg (CMS/DRL) principle. Data were sampled at 2048 Hz and a bandwidth of DC– 140 Hz. Additionally, six electro-oculography (EOG) electrodes were positioned around the two eyes to record horizontal and vertical eye movements. Electrode impedance was kept below 10 kΩ. The current position of the vehicle was continuously recorded by the EEG system.

Data analysis

Behavioral Data

Drivers usually have different preferences of the “ideal” car positioning on the road. Therefore, the ideal path was defined for each participant individually on the basis of his/her own driving data. The median of the distance between car and road side averaged across the complete driving road was thereto defined. Based on this individual “ideal” path, the driving error was operationalized as the accuracy of lane keeping and computed as the root-mean-squared deviance from the ideal path of each participant. In addition to the driving error as a measure of lane keeping performance, the driving lane variability was analyzed as a measure of mental workload. The driving lane variability was computed as the standard deviation of the individual path. Both measures, driving error and driving lane variability, were calculated separately for the three levels of crosswind. For analysis of different driving strategies, the group of older participants was subdivided into two subgroups with low vs. high driving lane variability (averaged across all levels of crosswind) by split-half-median,

Continued on Page 25


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Continued from Page 23

resulting in high-workload (Old-High: high driving lane variability) and low-workload (Old-Low: low driving lane variability) subgroups. In addition, driving lane variability was determined for the entirety of the younger group. While the younger group (mean age 25.1, SD 2.7 years; mean driving years 6.0, SD 2.3) differed significantly in age and years of driving licence from the Old-High group (mean age 65.4, SD 2.2 years; $t(26) = 43.6$; $p < .001$; mean driving years 44.5, SD 3.7 $t(26) = 33.3$; $p < .001$) and the Old-Low group (mean age 63.9, SD 4.8 years; $t(26) = 26.7$; $p < .001$; mean driving years 45.2, SD 3.9; $t(25) = 31.8$; $p < .001$), the two older subgroups did not differ (mean age: $t(26) = 1.0$; $p > .05$; mean driving years: $t(25) = 0.5$; $p > .05$; bonferroni-corrected t-tests). Both driving error and driving lane variability were subjected to two-way analyses of variance (ANOVAs) with within-subject factor crosswind condition (no, weak, strong) and between-subject factor group (Old-High, Old-Low, Young). Importantly, there were two separate analyses, with the between-subject factor either being workload or age: One ANOVA tested the factor workload within the group of older drivers (contrasting Old-Low vs. Old-High drivers), and the other one tested the factor age within a group of drivers with comparable low driving lane variability (contrasting Old-Low vs. Young drivers). Levene's test was used to control the homogeneity of variance and in case of inhomogeneous variances, degrees of freedom were adjusted. To evaluate the practical significance of the findings more accurately, effect sizes (here: partial $\eta 2$) were computed.

EEG Data

Recorded data were re-referenced using the reference electrode standardization technique (REST, [33]) across all 64 scalp electrodes. REST has some advantages over the commonly used average reference and tends to obtain more accurate and objective results (e.g. [34, 35, 36]). Data were bandpass-filtered (0.5–45 Hz), down-sampled to 128 Hz, and segments from 500 to 1000 ms around the irrelevant auditory distracters were extracted. The period of 200 ms before each tone was used as baseline. Segments with EEG artifacts were removed using the statistics based tools as implemented in EEGLAB. On the cleaned data, an independent component analysis (ICA) was applied. With the aid of ADJUST [37] and additional visual inspection artifacts were semi-automatically identified and removed.

As the spectral properties of the EEG vary strongly between individuals, in particular when different age groups are considered, the frequency bands for each subject were adjusted individually based on the individual alpha frequency (IAF). One method to determine the IAF is the gravity frequency (GF) method. GF is a measure of a central tendency within a given frequency range (most common in the alpha band) and is defined as the weighted sum of spectral estimates, divided by the total power [21, 38]. Based on the $GF\alpha$ the theta-range as IAF– 5 Hz to IAF– 3 Hz, the alpha-range as IAF– 2 Hz to IAF + 2 Hz, and the beta range as IAF + 4 to IAF + 18 Hz were defined. Mean power values for Alpha, Beta, and Theta bands were calculated for a fronto-central (FCz) and a posterior electrode site (POz), and subjected to three-way ANOVAs with within-subject factors crosswind condition (no, weak, strong) and electrode site (FCz, POz) and between-subject factor group (contrasting Old-Low vs. Old-High drivers or Old-Low vs. Young drivers; see above).

Results

Behavioral Data

The driving error increased with increasing crosswind ($F(2,78) = 67.35$, $p < .001$, $\eta 2 = .63$; Fig 2A). However, the three groups did not differ, neither in overall driving error, nor in the effect of crosswind on driving error (both $p > .05$; $\eta 2 \leq .08$). As expected, driving lane variability differed between groups ($F(2,39) = 9.54$, $p < .001$, $\eta 2 = .33$), and post-hoc t-tests confirmed that the Old-

Continued on Page 27

Continued From Page 20

Orange cables run under the vehicle just inside the frame rails on most hybrid and electric vehicles. The battery for many electric vehicles is underneath the vehicle and can be easily damaged by a hoist. After a hybrid or electric vehicle has been serviced, it may be necessary to push the vehicle to another part of the shop or outside as parts are ordered. Make sure to tape any orange high-voltage cable ends that were disconnected during the repair procedure. Permanent magnets are used in all the drive motors and generators and it is possible that a high-voltage arc could occur as the wheels turn and produce voltage. I generally mark my disabled high-voltage lab vehicles with a sign indicating the high-voltage concern and not to touch.

During routine vehicle service work, there is no need to go through any procedures needed to de power or to shut off the high-voltage circuits. However, if work is going to be performed on any of the high-voltage components then service information procedures must be followed to prevent possible electrical shock and personal injury. To safely de power the vehicle, always follow the instructions found in service information for the exact vehicle being serviced. The steps usually include:

- Turn the ignition off and remove the key (if equipped) from the ignition and store it in a lock box to prevent accidental starting. If a push-button start is used, remove the key fob at least 15 feet (5 meters) from the vehicle to prevent the vehicle from being powered up. With the key fob out of the vehicle, attempt to start the vehicle to confirm no other key fobs are present in the vehicle.

- Remove the 12-volt power source to the HV controller and wait ten minutes for all capacitors to discharge. This step could involve removing a fuse or a relay or disconnecting the negative battery cable from the auxiliary 12-volt battery.

- Remove the high-voltage fuse or service plug or switch.

- Confirm there is no high-voltage power present before beginning the repair.

I find that the student's level of confidence when it comes to working on these vehicles dramatically increases after completing this task.

As you plan your curriculum around this subject this is much more to cover. The depth of the subject is only limited by your timeframe and your budget. With the increased use of start-stop systems it is clear that hybrid and electric vehicles are going to become more main stream and that this topic will have to be a part of every successful automotive program moving forward. If you would like to know more about the success we have had adding this subject to our program at our community college, feel free to reach out to me at curt@curtward.net.

Continued from Page 25

High group had a higher driving lane variability than the Old-Low group (p = .004), while the Old-Low group did not differ from the Young group (p = .768). The differences between groups became even greater with increasing crosswind ($F(4,78) = 8.56$, $p < .001$, $\eta 2 = .31$; **Fig 2B**).

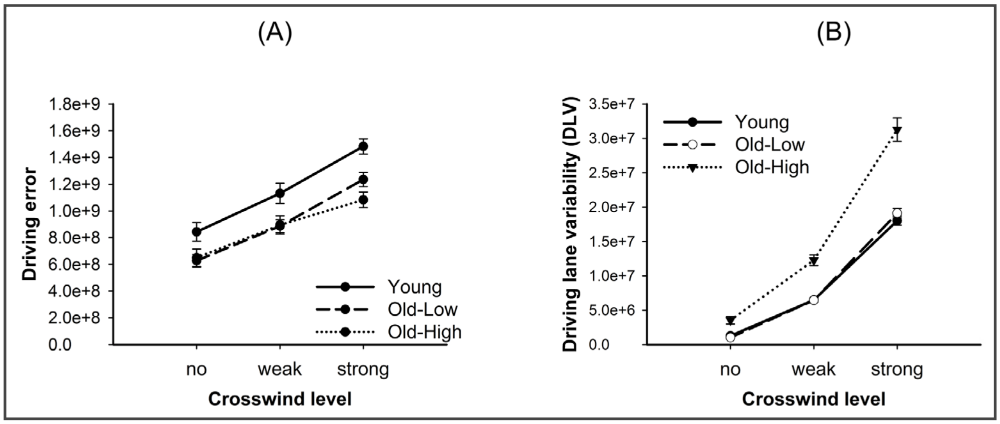

Figure 2.
Results of Behavioral Data.

(A) Driving error and (B) driving lane variability as function of crosswind level (no, weak, strong), shown for young participants and older participants with high (Old-High) and low (Old-Low) driving lane variability. Error bars are standard errors.

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EEG Data

Young vs. Old-Low group.

The posterior Alpha power did not depend on crosswind level. Also, there was no main effect of group and no interaction of crosswind level and group (all $p > .05$; all $\eta 2 < .11$; Fig 3A). However, the fronto-central Alpha power was slightly stronger in the Young than Old-Low group ($F(1,26) = 3.50$, $p = .073$, $\eta 2 = .12$) and decreased with increasing crosswind ($F(2,52) = 4.43$, $p = .024$, $\eta 2 = .15$). The posterior and fronto-central Theta power was stronger in the Young than Old-Low group (POz: $F(1,26) = 7.04$, $p = .013$, $\eta 2 = .21$; FCz: $F(1,26) = 19.34$, $p < .001$, $\eta 2 = .43$), while there were no significant main effects of crosswind level, and no interactions of crosswind level and group (all $p > .05$; all $\eta 2 < .08$; see Fig 3C). The fronto-central Beta power decreased with increasing crosswind ($F(2,52) = 4.89$, $p = .020$, $\eta 2 = .16$), while there were no significant main effects of group or interactions of crosswind level and group, neither for posterior, nor fronto-central Beta power (all $p > .05$; all $\eta 2 < .03$; **Fig 3B**).

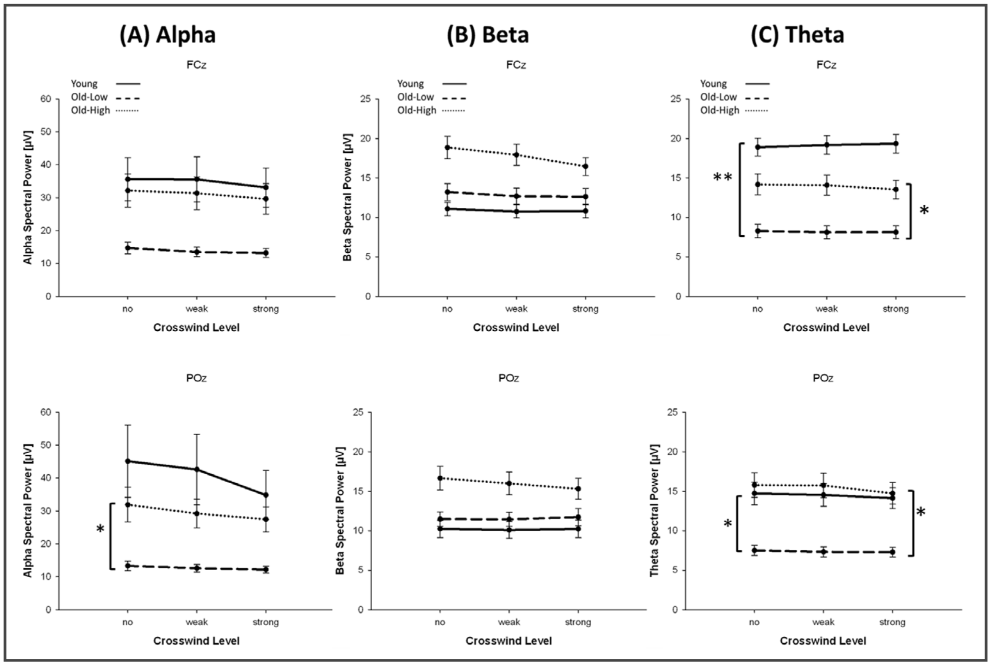

Figure 3.
Oscillatory brain activity in different frequency bands.

Spectral power (means and standard errors of means) of fronto-central and posterior Alpha (A), (overall) Beta (B) and Theta (C) band as function of crosswind level (no, weak, strong), shown for younger participants and older participants with high (Old-High) and low (Old-Low) driving lane variability. Significant group differences are indicated by asterisks;
**p < .05; **p < .01.*

https://doi.org/10.1371/journal.pone.0191500.g003

Continued on Page 31

Continued from Page 22

via voice over telephone (Nadworny, 2020), used hard copy exchange of instructional materials through pickup and drop-off sites (Shah, 2020), or chose to travel within communities to provide intermittent face-to-face home instruction for students who could not access technology-based instructional resources from their homes or other off-campus sites (Mitchell, 2020).

Compounding these challenges, LEAs also needed to ensure that families and students within the community could (a) use the technology resources and communication avenues, and (b) access, understand, and support students' use of the instructional materials. Significant instructional responsibilities fell to families with the closure of schools, including the use of effective instructional strategies for their children with disabilities (Lake, 2020). In some instances, family members were responsible for effectively presenting instructional materials for their children. This required skills that special educators receive years of training and practice to master. In one example, students with extensive support needs who needed physical materials and direct instructional support had instructional materials emailed to their families to print out and then present to the students. The teacher then followed up with parents over email or text after parents delivered instruction (Camera, 2020). This example illustrates some of the issues with technology access and other localized resource disparities that have left many students in rural communities with limited or nonexistent access to materials and effective remote instruction during the campus closures (Gross & Opalka, 2020). Circumstances such as these certainly have implications for equitable delivery of FAPE for students with disabilities in rural areas.

LEAs also had to train educators to use the remote instructional materials and to develop and deliver effective remote instructional procedures. The quick deployment of professional development to support technology-based remote learning was likely an additional challenge for many rural LEAs. Educators in rural school districts have historically received limited and often low-quality professional development related to technology-focused topics, and may lack mentors and professional learning communities to support technology learning (Checovich, 2019). Effective and individualized remote instruction for students with disabilities required another layer of educator training that rural and remote LEAs may have struggled to deliver during the school closures. Rural schools already face a critical shortage of teachers trained to provide specialized educational services for students with disabilities (Rude & Miller, 2018), and often experience constraints (i.e., geographic isolation, few readily accessible specialists) that limit special educators' access to professional development opportunities that allow them to adapt new instructional practices to meet the needs of their students (Farmer et al., 2018). The shortage of trained personnel and limited access to high-quality professional development likely impacted rural special educators' ability to rapidly move instruction for students with disabilities to the new remote learning format. Limitations such as these may put rural LEAs at risk of violating the procedural and/or substantive provisions of the IDEA in the time of COVID-19.

The closure of schools also reduced access to critical non-instructional resources for many rural families. In some rural and remote communities, brick-and-mortar schools may be the only source of consistent meals for students (Mitchell, 2020), and families with children with disabilities in these areas may rely on schools for child care as they maintain employment that cannot be conducted remotely (D. Little, 2020). Furthermore, school nurses may serve as the only point of connection between families and health care and community services (Gaines, 2020). The discontinuation of basic services provided by schools may have impacted families' ability to perform in their increased role in their children's educational instruction.

Finally, the direct impact of COVID-19 infection on rural and remote communities may affect the

Continued on Page 30

Continued from Page 28

equitable provision of FAPE for students with disabilities in these communities. Reduced health and wellness may have left rural families less able to participate in their increased role in the instructional process of their children with disabilities (Clarke, 2014). Many rural communities have limited access to high-quality health care services and information (Garcia et al., 2017). For some families coping with the direct and indirect effects of the pandemic, their children's access to educational services may have become secondary to more pressing needs, such as maintaining employment for financial solvency or attending to the physical needs of children or other family members. Within this context, some rural communities also coped with increased rates of COVID-19 infection. As the pandemic progressed, it has become increasingly clear that diverse populations in rural areas had a higher risk for contracting the virus. For example, during the second week of June 2020, the Navajo Nation Department of Health reported the highest COVID-19 infection rate in the United States (Mozes, 2020). These high rates of community infection may have caused families in rural and remote areas to, understandably, prioritize basic needs over the support of educational services for their children with disabilities. In light of these realities, we are suggesting LEAs focus on several key strategies to ensure the provision of a FAPE to students with disabilities in the time of COVID-19.

What Should Schools Do to Meet Individualized Needs in Compliance With the Guidance and Recommendations?

The sudden shift to the remote provision of educational services during COVID-19 has presented challenges to the provision of FAPE for students with disabilities in rural schools. However, there are multiple strategies that may help rural LEAs to ensure that students' legal rights are met. Historical literature on times of change in special education and research related to the key factors and facilitators of outcomes for students with disabilities identifies a number of strategies foundational to ensuring legal and ethical services for students with or at risk for disabilities (Skrtic & Knackstedt, 2018; Thorius & Maxcy, 2015; Yell et al., 1998). The following sections outline these foundational strategies related to educational rights within the context of the COVID-19 pandemic. Strategies include (a) understanding individualized student and family needs, (b) ensuring authentic family and community partnerships, (c) making data-driven decisions, (d) ensuring the validity of evaluation in online environments, and (e) ensuring research-based strategies for interdisciplinary and interagency collaboration. **Table 1**, page 32, provides a brief summary of these strategies.

Determine and Address Individualized Student and Family Needs

The development of IEPs starts with understandingindividualized student and family needs. As schools shift educational practices from in-person to remote learning, they must acknowledge the importance of assessing individualized needs and ensuring that the voices of each student and their families are heard and included in the educational process. This is especially true for teachers in rural schools as these teachers have indicated cultural differences between teachers and the rural community as one reason for attrition (Holme et al., 2017). With an explicit focus on understanding students' and families' needs and hearing their voices both individually and collectively, teachers may be better able to understand cultural norms and better individualize to meet educational needs. Educators can gather information from families in a range of ways, including electronically (text or email), through mail, or "face-to-face" with families (including through video-conferencing). Gathering input is essential. Even before COVID-19, many families across a range of demographics reported an increased preference for engagement through alternate forms of communication, such as text, email, or social media, compared with traditional phone calls or on-site meetings (Kraft & Rogers, 2015; Thompson et al., 2015). This makes the natural shift in practices during COVID-19 a unique opportunity to forge new relationships and change communication conventions for engaging

Continued on Page 32

Continued from Page 27

Old-High vs. Old-Low.

Posterior Alpha power was stronger in the Old-High than Old-Low group ($F(1,26) = 4.34$, $p = .047$, $\eta 2 = .14$), and there was no main effect of crosswind level and no interaction of group and crosswind level (both $p > .05$; all $\eta 2 < .11$; Fig 3A). Fronto-central Alpha power was also slightly stronger in the Old-High than Old-Low group ($F(1,26) = 3.66$, $p = .067$, $\eta 2 = .12$) and decreased with increasing crosswind ($F(2,52) = 7.81$, $p = .003$, $\eta 2 = .23$), but there was no interaction of crosswind level and group ($p > .05$; $\eta 2 < .04$). Fronto-central and posterior Theta power decreased with increasing crosswind (FCz: $F(2,52) = 3.79$, $p = .048$, $\eta 2 = .13$; POz: $F(2,52) = 3.79$, $p = .055$, $\eta 2 = .13$; Fig 3C). In addition, the Old-High group had a stronger Theta power than the Old-Low group (FCz: $F(1,26) = 4.68$, $p = .040$, $\eta 2 = .15$; POz: $F(1,26) = 8.11$, $p = .008$, $\eta 2 = .24$), without any interaction of crosswind and group (both $p > .05$; $\eta 2 < .08$). Beta Power decreased with increasing crosswind at the fronto-central position ($F(2,52) = 18.28$, $p < .001$, $\eta 2 = .41$) and—to a lesser degree—posterior position ($F(2,52) = 3.07$, $p = .074$, $\eta 2 = .11$). While there were no statistically significant main effects of group (both $p > .05$; $\eta 2 < .10$), there were significant interactions of crosswind level and group (POz: $F(2,52) = 6.27$, $p = .009$, $\eta 2 = .19$; FCz: $F(2,52) = 7.41$, $p = .005$, $\eta 2 = .22$; Fig 3B), indicating a greater effect of crosswind (i.e., decreasing Beta power with increasing crosswind) in the Old-High than Old-Low group.

Discussion

In a one-hour driving simulator lane-keeping task on a monotonous road with different crosswind levels no significant differences in driving error were found between the groups tested. Thus, younger participants and older participants with low and high driving lane variability did not differ in their ability to keep lane on the individual ideal path. Crosswind level had an effect on lane keeping performance: Increasing crosswind, reflecting increasing task difficulty, resulted in larger driving errors in all groups, as also found in previous studies [39, 40]. As a second measure, the driving lane variability was assessed that has been proposed as a correlate of the amount of mental workload mobilized while performing the driving task [30]. A higher variability of driving lane should reflect a higher effort of crosswind compensation and thus higher mental workload. For exploring electro-physiological correlates of mental workload the group of older participants was subdivided into two subgroups with low vs. high driving lane variability. As could be expected, differences in driving lane variability between these two older groups increased with increasing crosswind level, while driving lane variability did not differ between the Old-Low and Young groups.

The analysis of brain oscillations indicated a lower frontal Theta activity of the Old-Low group relative to the Young group. This difference in Theta power could be based on a general age-related decline in frontal Theta activity, which has also been observed in previous studies [41]. Kardos and colleagues (2014) [41] related this decline to the “inability to efficiently recruit attentional resources” of older adults which, for example, may result in deteriorated memory performance. However, given that the Old-Low and Young groups did not differ in driving error and driving lane variability, this age-related decline in frontal Theta activity obviously did not affect driving performance in the present lane-keeping task.
In contrast, Old-High participants showed a higher frontal Theta activity than Old-Low participants. Assuming frontal Theta activity to represent cognitive control and mental workload, this suggests that older drivers with high driving lane variability (need to) use more cognitive control to perform the driving task than older drivers with low driving lane variability, possibly resulting in greater demands of attentional resources and higher mental workload. Interestingly, higher frontal Theta activity in the Old-High group came along with higher Alpha activity over posterior and—to a lesser degree—frontal

Continued on Page 34

Continued from Page 30

families in the educational planning process.

Schools also need to assess the individualized and community-specific barriers to providing adequate remote instruction when creating policies and procedures for online instruction. Rural areas have

Strategy	Examples
Understand individualized student and family needs	
Determine each family's preferred method of communication	Ask families for their preferred mode of communication (e.g., email, phone, traditional mail) and be willing to use multiple modalities to communicate with families
Determine and address individual and community barriers to remote instruction	Provide a visually supported FAQ document to support remote learning materials Place WiFi hotspots in accessible community locations
Determine and address family health and wellness needs	Arrange regular and ongoing meal pickups for students Provide universal mental health and safety screenings
Develop partnerships with families and community members	
Communicate with families in a streamlined, frequent, and consistent way	Provide communication on a regular schedule using each family's preferred method
Engage families in decision making to meet community needs	Invite families to share issues that they encounter during the physical closure of schools Invite families to propose ideas for resolution of issues and incorporate their ideas when possible
Use data-driven decision making	
Maintain or increase the frequency of data collection for each student	Develop user-friendly data sheets for each student, aligned with students' IEP/IFSP goals and objectives Develop a data collection schedule for each student
Involve families in data collection, if appropriate	Provide families with visually supported directions for providing instruction and collecting data Provide remote or socially distanced family training using recommended safety measures
Consider the content and process of assessment to promote equity	Document the procedures used during assessment for each student Review documented assessment procedures for all students using a best practice checklist
Consider barriers to each student's access to content and instruction to promote equity	Document procedures used to provide instruction for each student Review documented instructional procedures for all students using a best practice checklist
Promote ethical and valid evaluation in remote learning environments	
Continue providing Child Find and educational evaluation services	Provide socially distanced home visits using recommended safety measures Provide online evaluations
Look to guidance from professional organizations	Review the Council for Exceptional Children's "COVID-19 Concerns for Special Education Administrators" document online Connect with regional and state education service agencies or co-ops for resources, supports, and legislation guidance
Ensure close monitoring and ongoing communication during evaluations	Document and regularly review evaluation procedures for each student
Ensure that families clearly understand their rights related to educational evaluation	Develop visually accessible and easy-to-understand flyers or handouts that list family rights pertaining to special education evaluation Regularly review rights with families
Promote interagency and interdisciplinary collaboration	
Use digital resources to establish connections between LEAs and community services agencies	After obtaining family consent, use shared secure cloud-based storage for coordinating meetings and services
Develop trainings to facilitate use of online resources and to promote successful meetings and collaboration	Create and post screencasts or videos that demonstrate the use of shared online platforms Provide training and coaching on strategies for effective collaboration and team meetings

Note. FAPE = free appropriate public education; LEAs = local education agencies; FAQ = frequently asked question; IEP = Individualized Education Program; IFSP = Individualized Family Service Plan.

Table 1: Strategies to Support the Provision of FAPE in Rural LEAs During School Shutdowns.

Continued on Page 33

Continued from Page 32

experienced barriers such as a lack of technology and poor or nonexistent internet access, which limits community-wide access to necessary services and educational supports. Also, issues such as assistance with technology setup and troubleshooting, supports for schoolwork, transportation to pick up needed meals through free and reduced lunch programs, and COVID-19 induced trauma should be considered. Although some barriers may not be easily removed, they can be addressed by individually assessing student and family needs during times of transition. For example, a "Frequently Asked Questions" document written in accessible terms with pictorial prompts can accompany a school issued electronic device or other remote instructional materials. District technical support provider contact information can be provided with this document. The district also may choose to clarify or designate locations or campuses where students could access WiFi hot spot stations and pickup meals from school breakfast or lunch programs while still adhering to safety guidelines. Routine check-in opportunities by educational team members, school counselors, school nurses, social workers, or other school personnel can also be considered. Within each of these procedural decisions, families and the community should be included in the decision-making process to accurately and adequately understand the unique student needs and potential impacts of policy changes. This requires authentic partnerships with families and communities.

Develop Partnerships With Families and Community Members

Another key strategy for ensuring that LEAs meet their legal obligations and maintain the rights of students and families during a time of significant change is through partnerships with families and communities. Authentic partnerships with families extend beyond sending home materials or messaging to families. These partnerships promote parents, caregivers, and community members as equal participants in the educational process, with shared and meaningful responsibilities (Barr & Saltmarsh, 2014; Coburn et al., 2013). Engagement with families is foundational to improved outcomes for students (Coburn et al., 2013). Family engagement has been associated with increased outcomes in reading, math, and overall academic achievement (Garbacz et al., 2016). Acknowledging these improved outcomes, federal regulations specify the involvement of families in the educational assessment of and planning for students with disabilities across the life span in both Part C serving infants and toddlers with disabilities and Part B of IDEA serving children of school age (IDEA, 2004). Although legislation and research support family engagement, schools rarely facilitate and develop authentic family partnerships (Garbacz et al., 2016).

When families and community members are engaged in educational planning processes and decision making, they are able to contribute to the process in ways that help school personnel to conceptualize FAPE within the unique present and future circumstances of an individual student. Families should be involved in their children's educational planning and given the opportunity to provide feedback on such issues as school-related activities and compensatory education programming. Providing families and community members with the opportunity to engage in decision-making processes has been linked to increased reports of confidence and competence, ultimately leading to early positive outcomes (Dunst & Dempsey, 2007). Family and community engagement may further help with procedural and substantive compliance in the provision of a FAPE.

COVID-19 has forced schools to shift practices and communicate more with students and families due to the remote provision of services and educational curriculum, providing a unique opportunity to increase interactions and improve relationships with families in the IEP process. To effectively communicate with families, schools should provide communication that is streamlined, frequent, and consistent (Francis et al., 2016). For example, an email, text, or letter (depending on the preference of the family) can be provided once a week on a specified day. Meaningful collaboration and authentic partnerships with families and community members should be primary goals for schools. Rather than

Continued on Page 35

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Continued from Page 31

areas (relative to the Old-Low group). High Alpha activity is usually associated with a relaxed mental state [42], drowsiness [43], or some kind of attentional withdrawal [23]. All these mental states may decelerate or reduce the responsiveness to stimuli [44] and enhance the probability of errors, which may be reflected in high driving lane variability in the present task. In contrast, older participants with low driving variability seem to be able to respond to different crosswind levels in a more anticipatory way, possibly due to a generally higher alertness, as indicated by lower Alpha activity.

While the Young and Old-Low groups did not differ, frontal Beta activity was slightly stronger in the Old-High than Old-Low group. Even more important, there was a highly significant interaction of group and crosswind level in Beta activity, indicating that the older participants with high driving lane variability showed a more pronounced decrease of Beta activity with increasing crosswind level than the Old-Low group. Since decreased Beta activity is usually associated with lower mental workload, this result appears to be counterintuitive at the first glance, because older drivers with high driving lane variability tended to show higher mental workload while driving (as indicated by a higher frontal Theta power than the Old-low group). In fact, there are several possible explanations: On the one hand, Beta activity might be associated with attentional modulation rather than with mental workload [45]. In their experiment, Gola and colleagues (2013) [45] adjusted the task difficulty in a way that the behavioral performances of younger and older participants were similar. They found that a subgroup of older participants (“high performers”) did not differ in Beta activity from young participants, whereas another subgroup (“low performers”) showed decreased Beta power in conditions with high task difficulty. This decrease of Beta power has been interpreted to reflect “the difficulty in activation and deficits in sustaining attentional processes” ([45] p. 334). The more prominent decrease in Beta activity with increasing task difficulty that was observed in the Old-High subgroup of the present study suggests that older participants with high driving lane variability had more difficulties in activation and sustaining of attentional processes while driving

Continued on Page 38

Continued from Page 33

just providing information to schools, families and community members should be actively engaged in shaping school practices to meet the unique needs of rural and remote communities. However, these collaborations require policies that also support and promote authentic regular ongoing engagement from families, not just in times of crisis (Green et al., 2018). Ongoing and consistent family and community engagement over time allows for increased trust building and also serves as an early detection system for identifying new needs or concerns in the community as they arise (Francis et al., 2016). For example, many districts began remote services by assessing the technology needs of their stakeholders. This allowed districts to distribute technology resources and establish broadband connectivity through deploying mobile hotspots for some rural areas.

Use Data-Driven Decision Making

Another way that rural LEAs can help ensure accurate and equitable decision making and FAPE in the educational system is through use of data (Datnow et al., 2013). Despite long-standing legislative requirements and research recommendations, data-driven practices in schools and early childhood systems continue to be an identified area of need in the field of education (J. W. Little, 2012), even during typical educational service delivery. The shift to remote instruction during the COVID-19 pandemic has only compounded this issue. Data collection is a necessary component for assessing students' academic, behavioral, and socio-emotional progress, and for making objective decisions about students' educational programming; the frequency at which data are collected must be maintained or even increased (Lane, 2007). Caregivers and families may become involved in data

Continued on Page 36

Continued from Page 35

collection through consensus of the IEP team. Family reporting in evaluation and data processes provides value and accuracy to the information upon which students' educational plans are built (Sheldrick et al., 2012). Garnering family input requires relationship building, authentic partnership with families, and highly trained special education teachers to ensure the substantive and procedural provisions of the IDEA are met.

The content and processes of data collection systems and assessments must be considered when they are used to measure and inform "meaningful educational progress." Assessment can become an issue of inequity if teachers do not consider barriers to learning and accessing both content and instruction. When teachers are aware of their students' needs, differentiated instruction (Tomlinson, 2000) and universal design for learning (Hitchcock & Stahl, 2003) can assist in ensuring students' needs and unique living circumstances are considered when determining educational expectations and outcomes.

For some students, especially students with disabilities such as emotional or behavioral disorders whose characteristics may include anxiety and internalized feelings and emotions, the trauma and cognitive dissonance that may be associated with COVID-19 and related consequences can impede the student's ability to learn. The impacts of trauma are a known barrier to learning (McInerney & McKlindon, 2014; Sitler, 2009), which may suggest that schools also must pay attention and collect data on students' internalized behavior during the pandemic. Schools should consider the use of behavior and trauma screeners to identify students who may benefit from social-emotional supports and trauma-informed practices. It is also important to consider the use of universal screeners for assessing other risk factors that may be elevated during the COVID-19 community shutdowns. For example, domestic violence has been reported at increased rates during the pandemic, with children living in 60% of households reporting domestic violence (Campbell, 2020). Community mental health and safety screenings should be considered for all students in rural LEAs during the pandemic, with consideration that children with disabilities are especially vulnerable to abuse and neglect (Lund et al., 2017).

Promote Ethical and Valid Evaluation in Remote Learning Environments

Related to the importance of assessment and screening in remote environments are the processes of identification and evaluation of students needing special education and early intervention services. Legal obligations related to Child Find start at birth under IDEA Part C regulations. Also, IDEA Part C mandates rapid referral and assessment timelines due to the multiple developmental changes that occur in the first 3 years of life (IDEA, 2004). Referrals, evaluations, and the addition of services and supports for infants and toddlers with or at risk of disabilities must occur year-round. To comply with Part C program timelines, some service providers have conducted evaluations via outdoor, socially distanced home visits using recommended safety measures such as wearing masks and washing hands. Other educational teams have conducted evaluations in online formats through the use of observation measures combined with validated parent report measures (McWilliam, 2020). Evaluation teams in kindergarten to 12th-grade educational settings have worked to gather high-quality existing data for review in eligibility redetermination processes, and have conducted some evaluations in online or socially distanced environments (Council for Exceptional Children [CEC], 2020a). Although these adapted processes have been developed by dedicated teams, researchers, and leaders, the changes may cause issues with standardized assessment validity due to changes in protocol and materials.

Professional organizations, such as the CEC, can provide guidance to rural LEAs concerning special education and early intervention evaluation in remote environments. For example, the authors of a recent CEC publication titled "COVID-19 Concerns for Special Education Administrators" recommend

Continued on Page 37

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Article: FAPE Continued from Page 36

that evaluations continue in remote environments despite concerns about validity (CEC, 2020a). They suggest that there is greater harm in delaying needed educational services than in providing adapted evaluations. However, it is important to acknowledge that assessment conducted in alternate formats must be monitored closely and include ongoing communication with relevant stakeholders. Student rights must be clearly articulated to families, including the options of outside evaluation or re-evaluation if there are concerns about school evaluation outcomes. Special education evaluation is another area where authentic partnerships with families can support accurate data collection, an understanding of the student's needs and skills, and a consideration of appropriate evaluation processes within the student's unique living circumstances.

A final consideration related to special education evaluation involves closely monitoring the data and progress of students who received evaluation but did not qualify for special education services. This monitoring may help to ensure that students continue to meet benchmarks in their educational curriculum and that legal obligations are met as students transition back to traditional educational settings and service delivery.

Promote Interagency and Interdisciplinary Collaboration

Ensuring that every student has access to a high-quality and collaborative team of professionals as mandated by legal obligations of IDEA (2004) should be maintained, despite the shift to online or other remotely delivered educational services. Teaming and collaboration within and across educational and community services can help educational teams to build and implement meaningful educational

Continued on Page 39

Continued from Page 31

(as indicated by higher frontal Beta activity) than older drivers with low driving lane variability. These difficulties could be associated with attentional withdrawal (as indicated by high Alpha activity) and the requirement of high cognitive control and mental workload (as indicated by high Theta activity) to adequately perform the driving task.

Alternatively, the decline of Beta activity could be based on a higher oscillatory modulation and/or a stronger desynchronization of EEG power [46]. Hanslmayr and colleagues (2012) [46] demonstrated that desynchronization in alpha and beta power is associated with the encoding and retrieval of memory. Accordingly, referring to mathematical models of information theory, the degree of encoded information is related to the amount of desynchronization, in a way that "… the more information needs to be encoded, the more desynchronized the firing of local neural assemblies needs to be" ([46] p.7). Thus, the relative decrease of Beta power at the high crosswind level (which was most pronounced in the older group with high driving lane variability) may be based on a stronger desynchronization of Beta power, reflecting the increased encoding of information in the most demanding task condition.

The present results are in accordance with the idea of two different neuro-behavioral states that have recently been demonstrated as fluctuations in the on-going oscillatory activity in a driving task with younger participants [32]. The authors distinguished between a proactive state in which sensory driving information is anticipated and actively used to plan future responses (characterized by a strong Beta/Delta Activity), and a reactive state in which the brain reacts to environmental information (characterized by activity within the alpha band). With reference to the present lane-keeping task, the two subgroups of older drivers could prefer different driving strategies. Drivers of the Old-Low group seem to prefer a rather alert and proactive driving strategy: For keeping the lane as precisely as possible, these drivers kept high attention to compensate for crosswind, as reflected in low driving lane variability. This driving strategy is associated with an overall reduced Alpha and Theta activity. On the other hand, the Old-High drivers responded rather reactive on crosswind, which resulted in a delayed compensatory steering activity and a higher driving lane variability. Thus, more cognitive control was necessary to achieve comparable results in lane keeping. The latter driving strategy was associated with higher consumption of mental resources, as indicated by high frontal Theta activity.

Conclusion

The present results suggest differences in driving strategies of older and younger drivers, with the older drivers using either a rather proactive and alert driving strategy (indicated by low driving lane variability and lower Alpha and Beta activity), or a rather reactive strategy (indicated by high driving lane variability and higher Alpha activity). As a consequence, the reactive driving strategy might be critical in complex or unpredictable traffic situations, in which extra mental resources are needed to react fast and correctly. Training interventions for improving the traffic safety of older drivers should therefore favour a more proactive and alert driving strategy that should leave more mental resources available for responding to additional critical events while driving.

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References may be viewed by clicking:
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Continued from Page 37

programs for students (e.g., Bricker et al., 2020; Bruder et al., 2019; Griffiths et al., 2020). During the school shutdowns, it is critical for schools to focus policies on supporting research-based teaming and collaboration practices via technology. Policies should include access to secure cloud formats for creating meeting agendas, sharing notes, viewing and discussing data, and engaging in planning activities. Furthermore, policies regarding training in use of features of online platforms to ensure face-to-face communication can occur regularly for relationship building, sharing and transfer of knowledge, and optimal understanding of communication can also be established. Training in successful meeting techniques can help to ensure efficient and effective use of time, a commodity often in sparse supply due to changing demands and challenges such as consultants and itinerate educational staff who span multiple teams (Splett et al., 2017). The use of effective meeting techniques also ensures that all voices on the team are not only allowed an opportunity to join conversations but are actively encouraged and supported in sharing their knowledge. This is critical to equalizing hierarchies and fostering successful outcomes through the IEP and the delivery of a FAPE (King et al., 2009).

In spite of the many challenges presented by the COVID-19 school shutdowns, these unique times have provided an opportunity for researchers, teachers, and leaders in education to acknowledge critical issues. Recent events have highlighted disparities and amplified critical needs that have gone unaddressed. The rise of these issues has spurred innovation and conversations as schools attempt to begin addressing some of these needs.

Conclusion

We suggest that special education practices in rural schools mirror the recommendations provided by the CEC (2020b) in regard to service provision and FAPE in the time of COVID-19. First, LEAs must ensure that remote learning and reopening plans are designed to include all students and their families in the planning and implementation discussions and initiatives. If LEAs cannot meet the service and support needs for all students, including those with the most extensive support needs, then providing these services would be unequal under the federal law. In addition, the CEC (2020b) emphasizes that LEAs must prioritize in-person services and schooling for young children and students with disabilities with the most intensive learning and behavioral needs to ensure FAPE. Second, changes to educational supports and services must ensure that vulnerable populations and communities are not put at even more of an increased risk for the community transmission of COVID-19. The impact of the virus' spread has been shown to be devastating, especially among individuals with disabilities and even more so in rural and remote communities. The efforts to support remote learning must focus on the need for equity of access to supports and services. Student educational outcomes cannot be limited by the number of technology tools they have access to, or the speed of their internet connection. Addressing long-standing disparities in access will be critical to meeting the procedural and substantive provisions of the IDEA. This will be especially true for students with disabilities in rural and remote LEAs across the United States. And third, all service delivery efforts should be designed to preserve the integrity of the IDEA and the substantive and procedural provisions contained in the federal rules and regulations. Only through ongoing authentic engagement with parents and other stakeholders can educational services and supports be developed through the IEP process in such a fashion as to meet unique educational circumstances and provide a means for "meaningful educational progress" and, ultimately, FAPE. Overall, education holds immense potential for breaking cycles of poverty and inequity, ultimately improving education and life outcomes. However, we must first acknowledge our current issues and barriers and create strategies for needed change. This in turn allows us to then move forward together in efforts to ensure a more equitable future for all students.

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