Name: _____ **Date:** _____

Language Arts 7

Research Documents

MORE PRO THAN CON

Source: Acceptability of smartphone technology to interrupt sedentary time in adults with diabetes.

Abstract

Breaking up sitting time with light- or moderate-intensity physical activity may help to alleviate some negative health effects of sedentary behavior, but few studies have examined ways to effectively intervene. This feasibility study examined the acceptability of a new technology (*NEAT!*) developed to interrupt prolonged bouts (≥20 min) of sedentary time among adults with type 2 diabetes. Eight of nine participants completed a 1-month intervention and agreed that *NEAT!* made them more conscious of sitting time. Most participants (87.5 %) expressed a desire to use *NEAT!* in the future. Sedentary time decreased by 8.1± 4.5 %, and light physical activity increased by 7.9± 5.5 % over the 1-month period. The results suggest that *NEAT!* is an acceptable technology to intervene on sedentary time among adults with type 2 diabetes. Future studies are needed to examine the use of the technology among larger samples and determine its effects on glucose and insulin levels.

DISCUSSION

The current study suggests that the *NEAT!* technology is a feasible and acceptable tool to intervene on sedentary time among adults with type 2 diabetes, who may be unduly adversely affected by excessive sitting. Participants used the technology for an average of 21 days over a 1-month period and indicated that using the technology made them more aware of how much time they spent sitting. Furthermore, the majority of individuals agreed that they would use the technology in the future if it were available, further suggesting *NEAT!*'s acceptability. As smartphone usage in the USA continues to rise, this ubiquitous technology may provide an opportunity to intervene to improve the health of a large proportion of the population.

CONCLUSIONS

Given the expected rise in the prevalence of diabetes in the USA, as well as the strong detrimental association between sedentary time and insulin or glucose levels, innovative approaches are needed to break up prolonged sedentary behavior among the large proportion of the popu-

lation affected by diabetes. The results of this study suggest that the *NEAT!* technology is an acceptable tool for use by adults with type 2 diabetes. Additional refinement of the technology is needed further to optimize improvements in sedentary time, physical activity, and breaks in sedentary behavior. Examination of longer-term effects of using the technology on glucose and insulin levels is also warranted.

Source: "High-Tech Agriculture Continues to Reap Rewards for Farmers and Society"

Just like a smart phone helps users learn, communicate and make important decisions, smart technology—known as precision agriculture—helps farmers know and apply critical information about the right investments in fertilizer, seed, pesticide and water needed to produce their crops. Through new technologies, farmers produce more efficiently and see an increase in profits while improving stewardship of ecosystems and local communities.

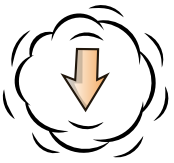
To talk about precision agriculture is to talk about mapping the amount of a crop grown per acre (yield) or the types of soils in a given area. It also includes the technology that automatically guides farm machines and controls variables like the rates of seeds, fertilizers or chemicals. Known as "VRT," variable rate technology is one of the most important components of precision agriculture simply because fertilizer or chemicals are applied only where and in the amount they are needed. Without VRT, a farmer fertilizes at an average rate across a field, so some areas of the field get too little fertilizer reducing yield, while other parts of the field get too much fertilizer, wasting money and potentially polluting nearby waterways.

While soil and yield mapping have been a standard method for determining the amount of fertilizer needed, new sensing systems are providing an alternative and more flexible method for determining inputs. Back in the 1990's, USDA-funded researchers at Oklahoma State University studied the problem of how to measure the amount of the common fertilizer nitrogen needed in a field.

Source: New "Smart" Clothes, Superfilter Named to Space Tech Hall of Fame
11.04.05

"Smart" clothes that can cool and heat and a new superfilter that will make drinking water safer are two commercial results of space technologies developed at NASA's Johnson Space Center recently recognized by the U.S. Space Foundation.

The patented technologies are among those named to the Space Foundation's Space Technology Hall of Fame for 2005. Established in 1988 jointly by NASA and the Space Foundation, the Space Technology Hall of Fame honors technologies developed for space which have found commercial applications. Each year, technologies are nominated and go through a rigorous selection process before final selection and induction.



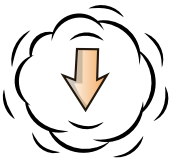
Both JSC technologies honored this year were funded by NASA's Small Business Innovation Research and the Small Business Technology Transfer programs. Those programs provide opportunities for small companies and research institutions to partner with NASA for research and development.

Smart Fabric Technology by Outlast Technologies, Inc., of Boulder, Colo., was honored for a fabric first developed for potential use in spacesuits. The goal was to create a material to better protect astronauts from the bitter cold and searing heat of space. The technology impregnates the fabric with microencapsulated paraffin wax that chemically reacts to counteract high or low body temperatures. The millions of microcapsules recycle stored energy by absorbing and releasing excess body heat. If a person is cold, the material becomes warm. If the person is hot, the material cools. It is being used commercially in gloves, boots, jackets and bedding.

NanoCeram® Superfilter by Argonide Corp., of Sanford, Fla., was honored for a new filter that uses strands of fiber one-quarter of a millionth of the size of a human hair. The filter technology was developed from NASA's work on advanced water recovery systems, systems designed to recycle wastewater on a spacecraft into potable water.

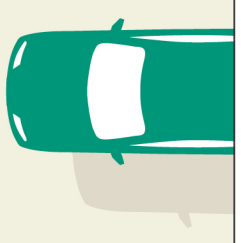
The nanoceramic filter is made up of nanofibers -- fibers so small that it takes more than 250,000 to equal the thickness of one strand of hair -- that attract and retain bacteria, viruses and other biological hazards. In 2002, the NanoCeram Superfilter was recognized as one of the top 100 most technologically significant new products by R & D Magazine. Although nanoceramic filters are not yet used in space, NASA has teamed with the Environmental Protection Agency which will implement the filters in removing arsenic from drinking water. The new technology also may be used in chromatography, the filtration of DNA, RNA and endotoxins, and in the sterilization of pharmaceuticals and medical serums.

"These are cutting edge technologies, things that seem like science fiction but are now in commercial use, improving lives on Earth," said Dr. Kumar Krishen, chief technologist and manager of the small business programs at JSC. "The development of innovative technologies like this is needed to enable the vision for space exploration to return to the moon and travel beyond."

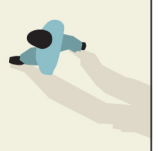


The Life-Saving Potential of Pedestrian Detection Systems

The average car is 4,000 pounds of metal and plastic.



The average American is about 180 pounds of flesh and bone.



When a car hits a pedestrian, the pedestrian's injuries can be devastating—and deadly.

A METHODOLOGY TO ESTIMATE THE SAFETY BENEFITS of PCAM

The **U.S. Department of Transportation**'s **Volpe Center** on behalf of the **National Highway Traffic Safety Administration,** developed and applied a methodology to estimate the safety benefits of **pedestrian crash avoidance and mitigation** technologies—or **PCAM** systems.

Because the best kind of crash is the one that doesn't happen.

WHAT IS PCAM?

PCAM systems are made up of vehicle **sensors** that detect pedestrians, warn drivers, and can apply automatic emergency brakes.

RADAR

CAMERAS

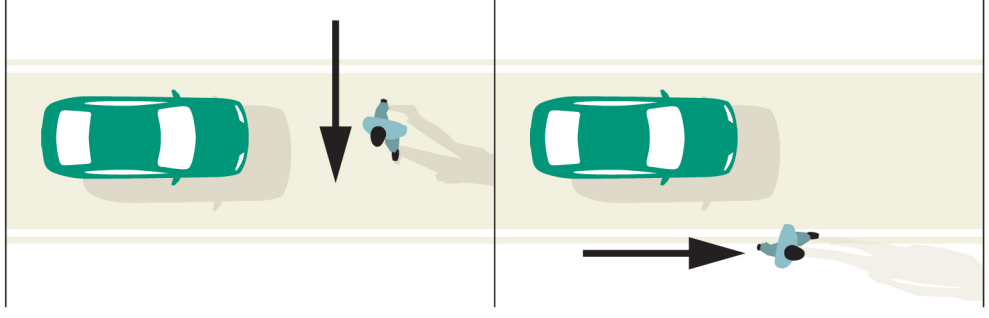
LASERS

The PCAM Safety Impact

Volpe Center data experts recently analyzed how PCAM systems can save lives and prevent serious injuries. They examined two **pre-crash scenarios:**

A car is going straight while a pedestrian is **crossing the road.**

A car is going straight while a pedestrian is **walking in or adjacent to the road, stationary, or moving with or against traffic.**



OVER A RECENT TWO-YEAR PERIOD, THESE SCENARIOS ANNUALLY AVERAGE:

33,000 crashes

3,000 fatal crashes

$33.4 billion in comprehensive costs

OVER THIS PERIOD,

PCAM systems could have reduced:

5,000 of these crashes

810 fatal crashes

$8.2 billion in comprehensive costs

LEARN MORE ABOUT THE LIFE-SAVING POTENTIAL OF PCAM SYSTEMS.

U.S. Department of Transportation Volpe Center

Data sources: U.S. DOT Volpe Center analysis; National Highway Traffic Safety Administration; Centers for Disease Control and Prevention.

Technologies for Creative Expression

June 2, 2014

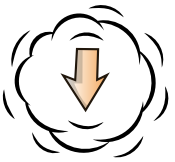
By Hayes Raffle

When I was seven years old there were a lot of art materials around the house. Blocks, clay, paint, paper—I loved to make things. My grandmother was an artist and my grandfather an inventor, and I had caught the bug. I would squeeze and sculpt Sculpey, a polymer clay my grandfather had created, draw new creations in my notebook, and learn math by creating geometric patterns with my Cuisinaire rods.

I grew up and kept playing with the materials and tools that I loved. At Yale College I studied sculpture and conceptual art, and through an artist internship helped create a new children's toy called ZOOB, which is the first construction toy based on things that grow. Children could create with ZOOB and reflexively learn about patterns and processes from nature, like how proteins fold and how skeletons move. They could bring their creations to life in their imaginations as they discovered what a century of life scientists had documented in papers and books. But while kids loved ZOOB, I noticed something was changing. It was the late 1990s and more and more of children's learning and play was being directed by electronic toys and media which followed predictable scripts–the buzzing of a horn, the sound of an alphabet–and didn't allow for children to tell their own stories.

So I went back to school to learn how to create interactive media that support people's creative expression. At the MIT Media Lab I joined the tangible media group and invented a series of interactive media and tools. Topobo is a constructive assembly system with kinetic memory. A construction toy in the spirit of ZOOB, but one that children can literally bring to life with a twist of their wrist. A child can make a dog, move its body in their hands, and watch the dog dance or walk, mimicking the motion they have taught it to do. Topobo helps kids learn new things. The same way stacking blocks helps kids learn how buildings stand up, Topobo helps them learn how animals walk, and how form is connected to motion. Kids know about this when they are little--they remember learning to crawl and walk--but usually we don't give them tools to think about it until they are in college. With new toys like Topobo, they can start playing with these ideas when they are four or five, and discover new patterns as they grow older.

As I was getting Topobo out to schools and museums around the world, my wife and I became proud parents of a newborn daughter. With her came the sad discovery that one cost of being more "mobile" was living far from family and being disconnected from them. Frequent trips from Cambridge, Massachusetts to California were tough, so I started making playthings for my baby which helped her get to know her far-away grandparents. Stuffed animals held familiar people's songs; a photo album of her grandparents had a phone number they could call to leave stories, songs, and messages. My daughter just had to touch their photos to hear them replay. But I didn't know how to bring a deeper sense of connection to lots of people.

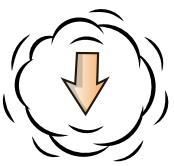


I moved to Nokia Research in Palo Alto, California to make family communication the focus of my work. In 2008 we joined with Sesame Workshop and created a series of tools for families with young children to have stronger relationships even when they are apart. Storyvisit was one such tool, a free web site that coupled children's story books and video chat. Families could hear and see each other, and also had something fun and understandable to do together: read a book! Children, sitting with their parents, could read along with a far-away parent, grandparent, aunt or uncle and get to know each other while they enjoyed some good books. Reading books was something everyone knew how to do, and something that could spark conversations. Tips for grown-ups would help them use the book to launch into conversations with the children. This is great both for kids' learning and for family togetherness. Our feeling was that there is no one better to learn from than the family who loves you the most, and we could use technology and media to bring families together and help them to tell their own stories to each other. It was a success: we documented hundreds of happy families whose conversations went from two to three minutes on an ordinary video call to 15-20 minutes with StoryVisit. Ten times more time with the three year old you loved meant that much more time to know and love each other. Since then video chat technologies have gotten better and a few startups like Kindoma are working to bring this idea to families everywhere.

As I was wrapping up this work I got a call from Google[x], at the time an almost unknown department of Google that a friend described to me as "the closest thing to Willy Wonka's Chocolate Factory in Silicon Valley." Curious, of course, I went and met Astro Teller ("captain of moonshots") and heard about the vision to create technologies with lasting cultural impact. I knew little about the details, but decided to take a chance and join the team. The small series of projects included the self-driving car, and a project in wearable computing which has become Google Glass. The project challenged me, because it was so very intimate and personal in its nature, but also opened an opportunity for empathy through the wearer's ability to share their point of view with people who are far away. The magic of a high-quality camera that was ready-at-hand spoke to the artist in me, so I dedicated myself to making it a tool that people could use to tell their own stories.

For me, Glass is a platform for empathy and creative expression. Some of my favorite stories are from activists, parents, artists, and teachers who are using this new form of photography to share their experiences with people they care about. There are journalists using Glass to support democracy, such as when Tim Poole did live broadcasts of protesters in the streets of Instanbul. (Tim has been doing journalism for years--the difference with Glass is that when he talks to people they are talking to him and not to his camera.) There are artists like David Dayton using Glass to embed stories into their traditional artworks and give audiences a new point of view into his artistic intent. There are mothers using Glass to help far-away grandparents get a mom's-eye-view of their newest granddaughter learning to lift her chin and smile at someone she loves.

Technology is changing so fast, and it's hard to know exactly where it will lead. But I've always been inspired by Alan Kay's quote that "the best way to predict the future is to invent it." I hope to continue to bring an artist's perspective to its evolution, so that the technologies we create do in fact become platforms for empathy, creative expression, and human connections.



Smart SPHERES Are About to Get A Whole Lot Smarter

[T]he Intelligent Robotics Group at NASA's Ames Research Center in Moffett Field, Calif., with funding from the Technology Demonstration Missions Program in the Space Technology Mission Directorate, is working to upgrade the smartphones currently equipped on a trio of volleyball-sized free-flying satellites on the space station called Synchronized Position Hold, Engage, Reorient, Experimental Satellites (SPHERES). . . .

By connecting a smartphone, the SPHERES become Smart SPHERES. They now are more intelligent because they have built-in cameras to take pictures and video, sensors to help conduct inspections, powerful computing units to make calculations and Wi-Fi connections to transfer data in real time to the computers aboard the space station and at mission control.
"With this latest upgrade, we believe the Smart SPHERES will be a step closer to becoming a 'mobile assistant' for the astronauts," said DW Wheeler, lead engineer with SGT Inc. in the Intelligent Robotics Group at Ames. "This ability for Smart SPHERES to independently perform inventory and environmental surveys on the space station can free up time for astronauts and mission control to perform science experiments and other work."
Later this year, NASA will launch a Project Tango prototype Android smartphone developed by Google's Advanced Technology and Projects division of Mountain View, Calif. The prototype phone includes an integrated custom 3-D sensor, which means the device is capable of tracking its own position and orientation in real time as well as generating a full 3-D model of the environment. . . .

In the long run, free-flying robots like SPHERES could also be used to inspect the exterior of the space station or future deep space vehicles. Robots like the smartphone-enhanced SPHERES and NASA's Robonaut 2, will provide some of the help of another crew member; SPHERES' cameras can act as another set of eyes, while Robonaut 2 literally adds another set of hands to act as an assistant with small and bulky items alike. An added bonus is that robots do not require any additional life support.

Rachel Hoover
Ames Research Center, Moffett Field, Calif.
Last Updated: Aug. 4, 2017
Editor: Kristine Rainey

MORE PRO THAN CON

Source: Common Internet of Things Devices May Expose Consumers to Cyber Exploitation Public Service Announcement from Federal Bureau of Investigation

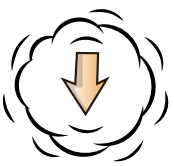
In conjunction with National Cyber Security Awareness Month, the FBI is re-iterating the growing concern of cyber criminals targeting unsecure Internet of Things (IoT) devices. The number of IoT devices in use is expected to increase from 5 billion in 2016 to an estimated 20 to 50 billion by 2020. Once an IoT device is compromised, cyber criminals can facilitate attacks on other systems or networks, send spam e-mails, steal personal information, interfere with physical safety, and leverage compromised devices for participation in distributed denial of service (DDoS) attacks.

IoT refers to a network of physical devices, vehicles, buildings, and other items (often called "smart devices") embedded with electronics, software, sensors, actuators, and network connectivity enabling these objects to collect and exchange data. Below are examples of IoT devices:

- Home automation devices (e.g., devices which control lighting, heating and cooling, electricity, sprinklers, locks);
- Security systems (e.g., alarm systems, surveillance cameras);
- Medical devices (e.g., wireless heart monitors, insulin dispensers);
- Wearables (e.g., fitness trackers, clothing, watches);
- Smart appliances (e.g., refrigerators, vacuums, stoves);
- Office equipment (e.g., wireless printers, computer mouse, outlets, interactive whiteboards);
- Entertainment devices (e.g., DVRs, TVs, gaming systems, music players, toys); and
- Hubs (devices that control other IoT devices through a single app).

As more businesses and homeowners use Internet-connected devices to enhance company efficiency or lifestyle conveniences, their connection to the Internet provides new vulnerabilities for malicious cyber actors to exploit. In 2016 and 2017, cyber actors have demonstrated the ease in which IoT device vulnerabilities can be compromised and leveraged. Deficient security capabilities, difficulties in patching vulnerabilities, and a lack of consumer security awareness provide cyber actors with opportunities to exploit these devices.

- In September 2016, cyber actors using the Mirai botnet infected IoT devices—including routers, cameras, and digital video recorders—for the purpose of conducting DDoS attacks. The actors exploited openly accessible devices via the Internet with common default usernames and passwords.
- In February 2017, a hacker compromised more than 160,000 printers with open connections to the Internet by scanning for those with specific open ports. The hacker claimed the devic-



es were part of a botnet and sent print jobs to the affected printers.

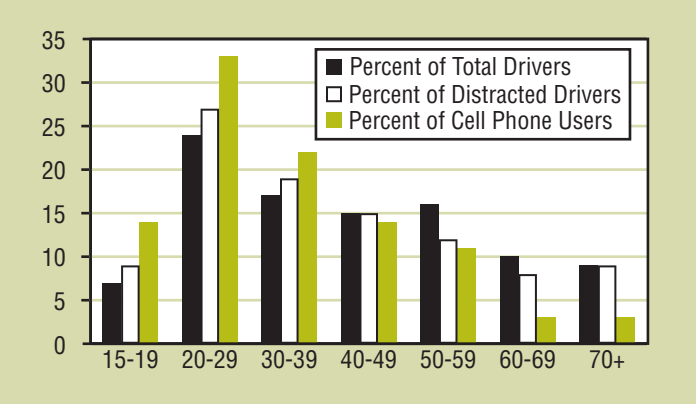
- In August 2017, a cyber actor released a list of over 33,000 usernames and passwords for IoT devices, including cameras, DVRs, and routers. While the majority of these devices were located in Asia and China, many of the devices were also found in the United States. A researcher conducted a test against this list and discovered many of these devices were almost instantly exploited, often taking less than two minutes between discovery and infection.

Unsecured or poorly secured devices provide opportunities for cyber criminals to intrude on private networks and gain access to other devices and information attached to these networks. Cyber criminals often take advantage of default usernames and passwords to merge IoT devices with others into a large botnet. These botnets can facilitate DDoS attacks against popular Web sites or network resources. These attacks cause Web sites to run slow, prevent users from being able to connect, or potentially take down multiple Web sites associated with the network under attack.

Source: "Distracted Driving 2015" (A Traffic Safety Facts Research Note)

Figure 1

Percent Distribution of Drivers Involved in Fatal Crashes By Age, Distraction, and Cell Phone Use, 2015



Source: NCSA, FARS 2015 ARF

Much attention across the country has been devoted to the dangers of using cell phones and other electronic devices while driving. In 2015, there were 442 fatal crashes reported to have involved cell phone use as a distraction (14% of all fatal distraction-affected crashes). For these distraction-affected crashes, the police crash report stated that the driver was talk¬ing on, listening to, or otherwise manipulating a cell phone. (or other cell phone activity) at the time of the crash. A total of 476 people died in fatal crashes that involved the use of cell phones or other cell-phone-related activities as distractions.

Table 2 presents 2015 fatal crash data for distraction-affected crashes by driver's age. Nine percent (290 of 3,183) of all drivers 15 to 19 years old involved in fatal crashes were distracted at the time of the crash. This age group has the largest proportion of drivers within each respective age group who were distracted (column titled "Distracted Drivers: % of Total Drivers").

The comparison of the proportion of drivers of each age involved in fatal crashes and those involved in distraction-affected fatal crashes points to over-representation of drivers under 30. This comparison is presented in the columns titled "Distracted Drivers: Percent of Distracted Drivers" versus "Total Drivers: Percent of Total Drivers." For all fatal crashes, 7 percent of the drivers in the fatal crashes were 15 to 19 years old (3,183 of the 48,613). However, for distracted drivers in fatal crashes, 9 percent of the distracted drivers were 15 to 19 years old (290 of the 3,183 distracted drivers in fatal crashes). Fourteen percent of all the distracted drivers using cell phones were 15 to 19 years old (64 of the 456 cell-phone distracted drivers in fatal crashes). Similarly, drivers in their 20s make up 24 percent of drivers in all fatal crashes but are 27 percent of the distracted drivers and 33 percent of the distracted drivers who were using cell phones in fatal crashes.

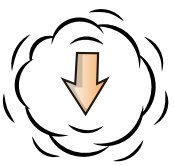
Source: "Effect of Smart Phone Use on Dynamic Postural Balance"

INTRODUCTION

Smart phones are one of the devices that modern people use the most. As of Jan. 2013, there are more than 33 million smart phone users in Korea. It is the most generalized generally used electrical device. A smart phone is a mobile phone with various functions of in addition to the tradition- al a computer, and it enables use of many social networking services like such as Twitter and Facebook functions of calling and texting. It requires more concentration than a traditional mobile phone. According to one study of smart phone use among young people, average daily use during weekdays was 5.1 h and 5.9 h during weekend. It means that young people use smart phones considerably in their daily routine, and most of that use was chat messages.

Despite various downsides of smart phone use, unlike its convenient aspects, studies of its negative effects have not yet been conducted. Most studies have investigated the psychological harm of smart phone addiction. Smart phones, the electrical device that people use the most in their daily lives, also offers SNS services such as video clips, and mobile net surfing. According to the Korea Internet & Security Agency, people use smart phones the most when they're waiting on something, or when they're in moving vehicle. Dual task situations, such as smart phone use while standing in a moving vehicle, can be a posture-threatening factor similar to reading a newspaper while standing on an unstable base. However, few studies have investigated this aspect of smart phone use. Therefore, the present study examined what kind of effect smart phone use has on dynamic postural balance.

Smart phones have already become a part of our daily lives and they offer us many conveniences, but like all the other modern conveniences, their negative effects on our life should not be overlooked. One of the most serious consequences of smart phone use is that it is habit-form-



ing. That means when people don't use a smart phone, they feel nervous and they become physiologically dependent on them, habitually depending on their smart phone. Chang min Seo et al. defined "Smart phone addiction as being immersed in smart phone use with no self-control, resulting in harmful consequences for self and others".

SUBJECT AND METHODS

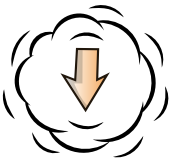
The study subjects were 30 healthy students attending C University who were in their 20s. Subjects who had vestibular problems, reported dizziness, or had difficulty with standing balance due to ankle or knee pain or injury were excluded from the experiment. All subjects received sufficient explanation about the study, and they voluntarily participated in the study. Approval for this study was obtained from the Ethical Committee of the Catholic University of Pusan.

from DISCUSSION section at end of article

To sum up, subjects showed the highest instability under the dual task condition of smart phone SNS use. This result can be understood as meaning that SNS requires more concentration than texting. Compared to the texting service of traditional mobile phones, smart phone SNS enables people to have conversation with many people at the same time, which is better than a one-to-one text sending function. In addition to that, smart phones also offer exchange of various information through pictures, video and internet news delivery etc. That is, smart phone SNS help people to form networks anytime and anywhere they want, regardless of time and space, realizing social relationships in a mobile on-line environment which was previously realized at static computer terminals. On the other hand, smart phone use requires significant concentration.

Smart phones can be used anytime and anywhere in our life because they're easy to carry and use, but they can have negative effects on walking. In the recent study of Eric and Lisa, it was reported that the use of a mobile phone during gait decreased walking speed by 33%, and they also reported that the use of a mobile phone increases lateral deviation during gait by 61% due to a decrease in concentration. This result is in agreement with the results of the present study which showed a decrease in dynamic balance ability when subjects use text messages.

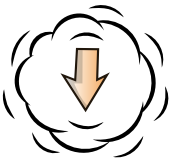
The ability to maintain upright standing position is the most basic skill required for gait and other dynamic behaviors. However, in the present study, we found that the use of a smart phone can increase the instability of dynamic postural balance. Therefore, use of a smart phone in situations such as while walking or in a moving vehicle should be discouraged.



from **Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students**

KADİR DEMİRCİ, MEHMET AKGÖNÜL and ABDULLAH AKPINAR
Department of Psychiatry, School of Medicine, Süleyman Demirel University, Isparta, Turkey

Background and aims: The usage of smartphones has increased rapidly in recent years, and this has brought about addiction. The aim of the current study was to investigate the relationship between smartphone use severity and sleep quality, depression, and anxiety in university students. Methods: In total, 319 university students (203 females and 116 males; mean age = 20.5 ± 2.45) were included in the study. Participants were divided into the following three groups: a smartphone non-user group (n = 71, 22.3%), a low smartphone use group (n = 121, 37.9%), and a high smartphone use group (n = 127, 39.8%). All participants were evaluated using the Pittsburgh Sleep Quality Index, Beck Depression Inventory, Beck Anxiety Inventory; moreover, participants other than those in the smartphone non-user group were also assessed with the Smartphone Addiction Scale. Results: The findings revealed that the Smartphone Addiction Scale scores of females were significantly higher than those of males. Depression, anxiety, and daytime dysfunction scores were higher in the high smartphone use group than in the low smartphone use group. Positive correlations were found between the Smartphone Addiction Scale scores and depression levels, anxiety levels, and some sleep quality scores. Conclusion: The results indicate that depression, anxiety, and sleep quality may be associated with smartphone overuse. Such overuse may lead to depression and/or anxiety, which can in turn result in sleep problems. University students with high depression and anxiety scores should be carefully monitored for smartphone addiction.



F***rom*** **Traffic Safety Facts**
Research Note
U.S. Department of Transportation
National Highway Traffic Safety Administration

Motor Vehicle Traffic Crashes and Distraction-Affected Crashes by Year, 2011-2015

	Crash Severity	**Overall Crashes**	**Distraction-Affected Crashes** (% of Total Crashes)	**D-A Crashes Involving Cell Phone Use** (% of D-A Crashes)
2011	Fatal Crash	29,867	3,047 (10%)	354 (12%)
	Injury Crash	1,530,000	260,000 (17%)	15,000 (6%)
	PDO* Crash	3,778,000	563,000 (15%)	35,000 (6%)
	Total	**5,338,000**	**826,000 (15%)**	**50,000 (6%)**
2012	Fatal Crash	31,006	3,098 (10%)	380 (12%)
	Injury Crash	1,634,000	286,000 (18%)	21,000 (7%)
	PDO* Crash	3,950,000	619,000 (16%)	39,000 (6%)
	Total	**5,615,000**	**908,000 (16%)**	**60,000 (7%)**
2013	Fatal Crash	30,202	2,923 (10%)	411 (14%)
	Injury Crash	1,591,000	284,000 (18%)	24,000 (8%)
	PDO* Crash	4,066,000	616,000 (15%)	47,000 (8%)
	Total	**5,687,000**	**904,000 (16%)**	**71,000 (8%)**
2014	Fatal Crash	30,056	2,972 (10%)	387 (13%)
	Injury Crash	1,648,000	297,000 (18%)	22,000 (8%)
	PDO* Crash	4,387,000	667,000 (15%)	46,000 (7%)
	Total	**6,064,000**	**967,000 (16%)**	**69,000 (7%)**
2015	Fatal Crash	32,166	3,196 (10%)	442 (14%)
	Injury Crash	1,715,000	265,000 (15%)	21,000 (8%)
	PDO* Crash	4,548,000	617,000 (14%)	48,000 (8%)
	Total	**6,296,000**	**885,000 (14%)**	**69,000 (8%)**

*PDO – Property Damage Only. Sources: NCSA, FARS 2011–2014 Final File, FARS 2015 ARF, GES 2011-2015.