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Негосударственное образовательное частное учреждение
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Программа вступительного экзамена
Дисциплина «Иностранный язык»

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Профиль подготовки
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Квалификация выпускника
Исследователь. Преподаватель-исследователь

Форма обучения
очная, заочная

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Цель вступительного испытания – определить уровень развития у аспирантов иноязычной коммуникативной компетенции. Под иноязычной коммуникативной компетенцией понимается умение соотносить языковые средства с конкретными сферами, ситуациями, условиями и задачами общения, рассматривать языковой материал как средство реализации речевого общения.

1. Требования к поступающим

На вступительном экзамене поступающий должен продемонстрировать умение пользоваться иностранным языком как средством межкультурного общения в научной и профессиональной сферах. Поступающий должен владеть орфографическими, лексическими и грамматическими нормами иностранного (английского) языка и правильно использовать их во всех видах речевой деятельности, представленных в сфере профессионального и научного общения.

Учитывая перспективы практической и научной деятельности аспирантов, требования к знаниям и умениям на вступительном испытании осуществляются в соответствии с уровнем сформированности следующих навыков и умений:

Говорение и аудирование: на экзамене поступающий должен показать владение неподготовленной диалогической речью в ситуации официального общения в пределах вузовской программной тематики. Оценивается умение адекватно воспринимать речь и давать логически обоснованные развёрнутые и краткие ответы на вопросы экзаменатора, в том числе на вопросы по содержанию прочитанного текста по специальности (см. далее).

Чтение: контролируются навыки изучающего чтения. Поступающий должен продемонстрировать умение читать оригинальную литературу по специальности, максимально полно и точно переводить её на русский язык, пользуясь словарём и опираясь на профессиональные знания и навыки языковой и контекстуальной догадки. Письменный перевод должен соответствовать нормам русского языка.

Грамматика:

Порядок слов простого предложения. Сложное предложение: сложносочиненное и сложноподчиненное предложения. Союзы и относительные местоимения. Эллиптические предложения. Бессоюзные придаточные. Употребление личных форм глагола в активном залоге. Согласование времен. Функции инфинитива; инфинитив в функции подлежащего, определения, обстоятельства; оборот дополнение с инфинитивом (объектный падеж с инфинитивом); оборот подлежащее с инфинитивом (именительный падеж с инфинитивом); инфинитив в функции вводного члена; инфинитив в составном именном сказуемом (be+инф.) и в составном модальном сказуемом; оборот *for* + сущ. + инфинитив. Функции причастия: причастие в функции определения и определительные причастные обороты; независимый причастный оборот (абсолютная причастная конструкция). Функции герундия: герундий в функции подлежащего, дополнения, определения, обстоятельства; герундиальные обороты. Сослагательное наклонение. Модальные глаголы с простым и перфектным инфинитивом: функции глаголов *should*, *would*. Условные предложения. Атрибутивные комплексы (цепочки существительных). Эмфатические (в том числе инверсионные) конструкции: предложения с усилительным прилагательным *do*; инверсия на первое место отрицательного наречия, наречия неопределенного времени или слова *only* с инклюзией ритмического (непереводимого) *do*; оборот *it is ... that*; инверсия с вводным *there*.

2. Содержание вступительного испытания

1. Краткая беседа с преподавателем на следующие темы:

– научные интересы,

- полученное образование,
- вуз, в котором было получено высшее образование,
- тема выпускной квалификационной работы,
- специфика профессиональной деятельности,
- выступления на научных конференциях,
- мотивы поступления в аспирантуру,
- выбранном научном направлении исследований.

На подготовку к ответу отводится примерно 10-15 мин.

2. Чтение и письменный перевод оригинального текста по направлению подготовки (научной специальности) со словарём. Беседа по содержанию прочитанного. Объём текста - 2000 печатных знаков, время выполнения - 60 минут. Форма проверки: проверка подготовленного перевода (если за указанный отрезок времени 75% от задания не выполнено, то экзаменуемый не допускается к дальнейшей сдаче экзамена); ответ на вопросы преподавателя по содержанию прочитанного. См. Приложение.

3. Критерии оценки знаний по иностранному языку поступающих

Оценка ответов поступающих на программы подготовки научно-педагогических кадров в аспирантуре по дисциплине «Иностранный язык» проводится по пятибалльной шкале и выставляется согласно критериям, приведённым в таблице.

Оценка	Критерии
«Отлично»	1. Коммуникативная задача выполнена полностью. Осуществляется активное взаимодействие с собеседником. Словарный запас полностью адекватен поставленной задаче, характеризуется разнообразием и идиоматичностью, используются разнообразные грамматические средства, допускаются 1-2 негрубые ошибки, не затрудняющие понимание и не искажающие смысл. 2. Письменный перевод выполнен в полном объёме, стилистически грамотно с точным подбором адекватных лексических (терминологических) средств перевода научной литературы.
«Хорошо»	1. Коммуникативная задача выполнена, но не в полном объёме. Беседа, в целом, логична и последовательна. Не всегда отмечается активное взаимодействие с собеседником, возникают некоторые затруднения при понимании друг друга. Словарный запас, в целом, соответствует поставленной задаче, но недостаточно разнообразен, имеются 3-4 негрубые грамматические ошибки, не затрудняющие понимания и не искажающие смысл. 2. Письменный перевод выполнен в полном объёме, но с небольшими стилистическими лексико-грамматическими неточностями.
«Удовлетворительно»	1. Коммуникативная задача выполнена частично. Отмечаются нарушения в логике ведения беседы, не отмечается активное взаимодействие с собеседником.

	Словарный запас не всегда соответствует поставленной задаче, грамматические средства однотипны, имеются грамматические ошибки, затрудняющие понимание высказывания. 2. Письменный перевод выполнен не в полном объеме и с стилистическими и лексико-грамматическими неточностями, нарушающими адекватное восприятие текста.
«Неудовлетворительно»	1. Коммуникативная задача не выполнена. Не может взаимодействовать с собеседником. Словарный запас не достаточен для выполнения поставленной задачи, речь почти не воспринимается на слух из-за большого количества ошибок. 2. Письменный перевод выполнен не в полном объеме и с большими стилистическими и лексико-грамматическими неточностями, ведущими к искажению понимания содержания иноязычного текста.

4. Литература для подготовки к вступительному испытанию

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15. Short J. English for Psychology in Higher Education Studies. Course Book. - Garnet Education, 2010.

Интернет-ресурсы

1. <http://psychology.about.com/> - Complete Guide to Psychology for Students, Educators and Enthusiasts
2. http://www.sciencedaily.com/news/mind_brain/psychology/ - Science Daily –

Тексты для перевода со словарем

Текст № 1

All the Rage: Survey extends reach of explosive-anger disorder

By Bruce Bower

A mental disorder that encompasses a wide range of recurring, hostile outbursts, including domestic violence and road rage, characterizes considerably more people than previous data had indicated, a national survey finds.

At some point in their lives, between 5.4 percent and 7.3 percent of U.S. adults qualify for a diagnosis of intermittent explosive disorder, concludes a team led by sociologist Ronald C. Kessler of Harvard Medical School in Boston. Those percentages, which depend on whether the syndrome is narrowly or broadly defined, correspond to between 11.5 million and 16 million people, respectively.

In any given year, intermittent explosive disorder affects between 2.7 percent and 3.9 percent of adults, or from 5.9 million to 8.5 million people, Kessler and his coworkers report. "We never thought we'd find such high prevalence rates for this condition," Kessler says.

In contrast, a 2004 study of 253 Baltimore residents estimated a lifetime prevalence of 4 percent for intermittent explosive disorder.

Intermittent explosive disorder features tirades, grossly disproportionate to the triggering circumstances, during which a person destroys property, tries to hurt or actually hurts someone, or threatens to do so. The expression of rage elicits a sense of relief, followed by remorse for the incident. The syndrome doesn't include outbursts that stem from other mental disorders or from alcohol or drug effects.

For lifetime-prevalence figures in the new survey, broadly defined intermittent explosive disorder consisted of at least three such episodes during a person's life. The narrowly defined version required three anger attacks in the same year.

For 1-year prevalence rates, the broad definition called for three or more anger attacks, at least one of which had occurred in the past year. The narrow definition required three attacks in the past year.

The findings, published in the June Archives of General Psychiatry, indicate that intermittent explosive disorder typically begins during adolescence and lasts for at least a decade, with an average of 43 episodes per person. A majority of those incidents targeted spouses or children, with potentially harmful effects on their emotional health (SN: 5/27/06, p. 323: Available to subscribers at <http://www.sciencenews.org/articles/20060527/fob1.asp>). During young adulthood or middle age, most people with intermittent explosive disorder developed other mental disorders, usually depression, anxiety, or substance abuse.

Kessler's team analyzed data from in-person interviews with a nationally representative sample of 9,282 adults, age 18 and older.

Researchers now need to examine whether youngsters with intermittent explosive disorder who are treated with cognitive therapy, relaxation training, or psychiatric medications avoid later

depression or other mental disorders, Kessler says.

The new survey offers a preliminary, possibly excessive estimate of intermittent explosive disorder's reach, remarks psychiatrist Darrel A. Regier, director of the American Psychiatric Association's office of research in Arlington, Va. Since clinicians didn't validate the diagnoses with detailed assessments, prevalence rates may have included people whose angry reactions fell within a normal range of responses to stressful situations, Regier notes.

"I take these prevalence estimates with a big grain of salt," he says.

It's unclear whether anger attacks by children and teens represent initial symptoms of broader problems, such as attention-deficit hyperactivity disorder or mood disorders, adds psychiatrist William E. Narrow of the American Psychiatric Association.

Текст № 2

Autism's DNA Trail: Gene variant tied to developmental disorder By Bruce Bower

Scientists have taken a promising step forward in untangling the genetic roots of autism. Inheritance of a common variant of a gene that influences immunity, gastrointestinal repair, and brain growth substantially raises the chances of developing autism, at least in families with more than one child diagnosed with the severe brain disorder, a study finds.

Children with autism show severe social difficulties, language problems, and repetitive behaviors. The gene, called *MET*, regulates production of a protein that influences cell proliferation in various parts of the body.

"This is a moderate-to-high-risk autism-vulnerability gene," reports developmental neurobiologist Pat Levitt of Vanderbilt University in Nashville.

Certain variants of the gene, which contain minor alterations in their genetic code, cause several cancers.

Levitt's group had explored how *MET* contributes to brain development. After learning that the gene lies on a stretch of chromosome 7 that other investigators had linked to autism, the group began its new study.

Consulting a large database, the researchers obtained genetic information from members of 204 families in which one or more children had autism. These children ranged from below average to average in intelligence.

The researchers then identified variants of *MET*. Study participants who carried two copies of a specific *MET* variant displayed autism substantially more often than the others did. Levitt's group later found the same association for children with autism in 539 additional families.

Further analyses indicated that the link between the *MET* variant and autism appeared primarily in families with two or more affected children, the researchers [report online this week](#) for an upcoming *Proceedings of the National Academy of Sciences*.

Laboratory tests showed that this *MET* form lowers the gene's activity and reduces its production of proteins that bind to various tissues.

If confirmed by other groups, these results would explain controversial reports that people with autism often have immune and gastrointestinal problems, according to Levitt.

Roughly 47 percent of the population carries at least one copy of the autism-associated *MET* variant. The researchers have yet to learn how it operates in the minority of that group that develops autism, which affects about 1 in 500 individuals, Levitt notes. In some people, beginning before birth, *MET* might respond to unknown environmental influences or interact with other genes to derail brain formation, Levitt theorizes.

Other researchers had reported preliminary associations between DNA regions and autism. "This is the first time someone has identified a candidate gene for autism, replicated their finding,

and demonstrated that gene's biological function," remarks geneticist Daniel H. Geschwind of the University of California, Los Angeles. *MET* may contribute to autism in diverse ways, he proposes.

However, *MET* could be just the tip of the genetic iceberg. "Autism will turn out to be many different disorders influenced by hundreds of genes," Geschwind predicts.

An effort is now under way, led by geneticist Anthony P. Monaco of the University of Oxford in England, to gather DNA from as many as 2,000 families with autistic children. When that database is completed in about a year, researchers will use it to confirm whether numerous candidate genes, including the *MET* variant, contribute to autism, Monaco says.

Текст № 3

Bigger brain = more intellectual capacity

Brain size matters for intellectual ability and bigger is better, McMaster University researchers have found.

The study, led by neuroscientist Sandra Witelson, a professor in the Michael G. DeGroot School of Medicine, and published in the December issue of the journal *Brain*, has provided some of the clearest evidence on the underlying basis of differences in intelligence.

The study involved testing of intelligence in 100 neurologically normal, terminally ill volunteers, who agreed that their brains be measured after death.

It found bigger is better, but there are differences between women and men.

In women, verbal intelligence was clearly correlated with brain size, accounting for 36 percent of the verbal IQ score. In men, this was true for right-handers only, indicating that brain asymmetry is a factor in men.

Spatial intelligence was also correlated with brain size in women, but less strongly. In men, spatial ability was not related to overall brain size. These results suggest that women may use verbal strategies in spatial thinking, but that in men, verbal and spatial thinking are more distinct.

It may be that the size or structure of the localized brain regions which underlie spatial skills in men is related to spatial intelligence, as was shown in previous research in Witelson's lab on the brain of Albert Einstein.

In a further sex difference, brain size decreased with age in men over the age span of 25 to 80 years, but age hardly affected brain size in women. It is not known what protective factors, which could be genetic, hormonal or environmental, operate in women.

It remains to be determined what the contribution of nature and nurture are to this cerebral size relationship with intelligence, Witelson said. She added that the results point to the need for responsibility in considering the likely future use of magnetic imaging (or MRIs) of brain structure as a measure of ability in student and workforce settings.

"We're going to need to be careful if, in the future, we use MRI brain scans as a measure of ability in any selection process," she said.

Текст № 4

Brain study shows the waiting is the hardest part

Anyone who has ever waited in dread to have a root canal may find some comfort in the findings of a new brain-imaging study.

For some people, researchers say, the waiting is indeed the hardest part, and finding a distraction might help.

Their study, published in the journal *Science*, used a brain-imaging technique called functional MRI to investigate the neural mechanisms underlying dread—specifically the agony of waiting to have a painful procedure. It found that among 32 volunteers who agreed to have a series of shocks to the foot, some of them dreaded each shock so much that they repeatedly opted to have a higher-voltage jolt just so they could get it over with more quickly.

These individuals, dubbed “extreme dreaders,” showed greater activity in a brain region related to both pain and attention. The findings, say the researchers, indicate that dread arises not from simple fear, but from the brain’s attention to the unpleasant event.

“The dread is often worse than the event itself,” said lead study author Dr. Gregory S. Berns, a professor of psychiatry and behavioral sciences at Emory University School of Medicine in Atlanta.

The brain-imaging results are “good news,” he told Reuters Health, because they indicate that extreme dreaders can do something to alleviate the problem: find a distraction - such as meditation, exercise or some other activity—to take the focus off the anticipated event.

For the study, Berns and his colleagues took brain images of volunteers who agreed to endure Electrical shocks to their feet. First, each jolt was preceded by a cue that told participants how intense it would be—60 percent of their maximum pain tolerance, for instance—and how long they would have to wait for it. In a second go-around, participants were presented with choices on how each shock should be delivered, with the voltage and timing of the jolt as the variables. For example, they could choose between having a shock at 90 percent of their maximum pain tolerance delivered in the next 3 seconds, or one at 60 percent intensity in 27 seconds.

Of the 32 volunteers, nine—the extreme dreaders—consistently opted for the stronger shock in order to avoid the longer wait.

This may seem illogical to many people, Berns said, but for extreme dreaders avoiding the anguished wait makes sense.

And it was the extreme dreaders who showed particularly high activity in the brain’s so-called pain matrix during the build-up to their Electrical shocks—specifically, in areas related to attention, but not those associated with fear and anxiety. In other words, extreme dreaders were giving more attention to their foot than “mild dreaders” were.

So finding a distraction may be the best way for extreme dreaders to deal with the wait for a medical procedure, Berns said. This, he noted, is something many people have “subjectively” known, but the new findings reveal the brain basis for it.

Текст № 5

Cell phones excite the brain but is that good or bad?

According to a new study the electromagnetic fields from cell phones excite the brain cortex adjacent to it and that possibly has implications for individuals with epilepsy, or other neurological conditions.

In a study by Italian researchers questions are again raised about mobile phones and their possible effects on the brain, and their link to cancers.

If industry estimates are to be believed as many as 730 million cell phones will be sold this year, to add to the 2 billion already in use around the world.

More than 500 million of these are a type that emits electromagnetic fields (EMFs) known as Global System for Mobile communications or GSM radio phones and their possible effects on the brain are unclear and controversial.

Many studies have looked at the effects of EMFs on the body, but few have focused on their effects on the brain.

Such effects could be harmful, neutral, or even beneficial and might be particularly important for individuals with conditions involving cortical excitability, such as epilepsy.

In their study Dr. Paolo Rossini of Fatebenefratelli hospital in Milan and colleagues used Transcranial Magnetic Stimulation or TMS to check brain function while people were using such phones.

Fifteen young male volunteers used a GSM 900 cell phone for 45 minutes and the researchers found that in 12 of the 15, the cells in the motor cortex adjacent to the cell phone showed excitability during phone use but returned to normal within an hour.

This outside layer of the brain and the motor cortex is known as the “excitable area” because magnetic stimulation has been shown to cause a muscle twitch.

The researchers say they have not shown that using a cell phone is bad for the brain in any way, but warn that people with conditions such as epilepsy, linked with brain cell excitability, could be affected.

They say more studies are needed to understand what this means in order to provide safe rules for the use of cell phones.

A range of studies from across the globe have come up with a mixed bag of results as to the dangers of using cell phones.

Текст № 6

Gay Males' Sibling Link: Men's homosexuality tied to having older brothers

Birth order may steer some men toward homosexuality in a process that perhaps begins before birth. A new study finds that homosexuality grows more likely with the greater number of biological older brothers—those sharing both father and mother—that a male has.

Men display this tendency toward homosexuality even if they weren't raised with biological older brothers, finds psychologist Anthony F. Bogaert of Brock University in St. Catharines, Ontario. No gay connection appears in men raised with half-brothers, stepbrothers, or adoptive brothers, all deemed non-biological by Bogaert.

"The mechanism underlying this fraternal birth-order effect remains unknown," Bogaert says. It's possible that succeeding pregnancies with male fetuses trigger a maternal immune response. A mother's immune system may treat male fetuses as foreign bodies, attacking them with antibodies that alter sex-related brain development, the Canadian psychologist suggests.

Scientists haven't yet looked for any specific immune reaction during pregnancy that targets later-born boys who become homosexual.

Bogaert's analysis of men's family histories appears in the July 11 *Proceedings of the National Academy of Sciences*. It confirms an analysis of sexual orientation in 604 men reported in 1996 by Bogaert and a colleague. That report didn't include men raised with non-biological older brothers, leaving open the possibility that some psychological reaction to older brothers fostered homosexuality.

The new investigation consists of 944 Canadian men for whom Bogaert verified background information, including sexual orientation and age, number of biological and non-biological siblings, whether siblings occupied the same house as children, and the biological mother's age at the participant's birth.

Critically, 521 of the men had grown up with one or more non-biological siblings.

The number of biological older brothers correlated with the likelihood of a man being homosexual, regardless of the amount of time spent with those siblings during childhood, Bogaert says. No other sibling characteristic, such as number of older sisters, displayed a link to male sexual orientation.

By accounting for potential psychological effects of having older brothers, Bogaert's data "strengthen the notion that the common denominator between biological brothers, the mother, provides a prenatal environment that fosters homosexuality in her younger sons," say neuroscientist S. Marc Breedlove of Michigan State University in East Lansing and his coworkers in a comment to

be published with the new report.

The release of maternal antibodies that boost a boy's probability of becoming gay is a provocative but untested hypothesis, Breedlove and his coworkers note. It makes sense, though, in light of previous failures to find any older-sibling influences on female homosexuality, they say.

Breedlove's group suspects that some boys are "born to become gay" as a result of genetic and prenatal factors. However, psychologist Daryl J. Bem of Cornell University argues that the new findings don't necessarily support that view.

Bem has proposed that genes and biology orchestrate temperaments that gear kids toward sex-typical or sex-atypical activities. Boys who don't like rough-and-tumble play perceive males as different from themselves, a feeling that may turn erotic during adolescence, Bem says.

Bogaert's work indicates that for homosexuality to develop, it doesn't matter whether boys feel different from sex-typical older brothers, only that they have older brothers, Bem acknowledges. Still, a maternal immune response could promote homosexuality by lowering a boy's aggression, rather than by stamping a same-sex orientation into the brain, Bem says.

Текст № 7

Hidden Smarts: Abstract thought trumps IQ scores in autism

There's more to the intelligence of autistic people than meets the IQ. Unlike most individuals, children and adults diagnosed as autistic often score much higher on a challenging, nonverbal test of abstract reasoning than they do on a standard IQ test, say psychologist Laurent Mottron of Hôpital Rivière-des-Prairies in Montreal and his colleagues.

The same autistic individuals who score near or below the IQ cutoff for "low functioning" or "mental retardation" achieve average or even superior scores on a test that taps a person's ability to infer rules and to think abstractly about geometric patterns, Mottron's team reports in the August *Psychological Science*.

"Intelligence has been underestimated in autistics," Mottron says. Autistic people solve problems and deploy neural resources in unusual ways, which are poorly understood and might contribute to problems with IQ tests, he asserts.

Mottron regards autism as a variant of healthy neural development. For that reason, his group—including study coauthor Michelle Dawson, herself diagnosed as autistic—prefers the term "autistic" to "person with autism."

The researchers studied 38 autistic children, ages 7 to 16; 13 autistic adults, ages 16 to 43; 24 nonautistic children, ages 6 to 16; and 19 nonautistic adults, ages 19 to 32.

Volunteers completed an age-appropriate IQ test and a Raven's Progressive Matrices test. The latter test includes 60 items, each consisting of a series of related geometric designs and a choice of six or eight alternative designs, one of which completes the series.

The nonautistic children and adults scored slightly above the population average on both tests.

In contrast, autistic kids and adults scored far higher on the Raven's test than they did on the IQ tests. These youngsters' average IQ was substantially below the population average, but their average score on the Raven's test was in the normal range.

One-third of autistic children qualified as "low functioning" by IQ, but only 5 percent did so by Raven's scores. Moreover, another third of the autistic children achieved "high intelligence" on the Raven's test.

As in previous research, autistic volunteers performed well on an IQ task that required them to reproduce geometric designs using colored blocks.

The new findings confirm prior indications that autistics score poorly on IQ tests despite

processing perceptual information well, comments psychologist Uta Frith of University College London. In a 2000 study, Frith's team noted that autistic and nonautistic children made equally rapid and accurate visual judgments, such as discerning which of two lines was longer.

In people with autism, a lack of social insight derails the ability to acquire skills and information from others, a key to IQ success, Frith theorizes. Autistics thus succeed only on self-explanatory tasks, such as the Raven's test.

The Raven's test may measure autistic intelligence better than an IQ test does, adds psychologist Helen Tager-Flusberg of Boston University. Nonetheless, many autistic children are extremely impaired intellectually, she says.

Researchers generally sell short the unique features of autistic intelligence, Dawson responds. For example, autistics shift flexibly back and forth between focusing on details of a scene or its overall configuration, whereas nonautistics single-mindedly concentrate on the big picture, she says.

Текст № 8

Highly educated more at risk of Parkinson's disease

New research has suggested that people with high levels of education and demanding careers also have an increased risk of developing Parkinson's disease.

According to scientists at the Mayo Clinic in Rochester, Minnesota, the chances of developing Parkinson's rises with years of education, or intellectually challenging jobs.

The highest risk was found in people who had studied for at least nine years, while miners, machine operators, metalworkers and farmers were less often affected.

The study results do not apparently mean that education or professional achievement cause the condition, but that people in these groups may lead lives that predispose them to the disease, or are more alert to its symptoms.

It appears that doctors are the most likely to develop the disease.

Jim Maraganore, of the Mayo Clinic team, says the figures indicate a baseline risk of 2 per cent to develop Parkinson's disease during a lifetime, to a rise in the risk of 4 per cent if you are highly educated or a physician, or 1 per cent if you are less educated or more physically active.

He does not suggest a change of schooling plans or occupations should be made on the basis of the findings.

One possible and rather obvious explanation for the higher rates of Parkinson's among doctors and more educated individuals could be that these people are more likely to recognise symptoms and seek professional help, and thus be diagnosed earlier.

Another possibility is that genetic or other factors that make people more likely to develop Parkinson's also enhance the enjoyment they get from education, and thus encourage them to pursue their studies.

The study is published in the current edition of Neurology.

Текст № 9

How traumatic events leave a mark on the brain

Researchers in the US have discovered a potential mechanism to explain why people retain stronger memories of events that occur in emotionally charged situations.

The findings, by Hallan Hu and colleagues at the Cold Spring Harbor Laboratory, may have implications in understanding the causes of, and developing better treatments for, post traumatic stress disorder, in which people suffer vivid flashback memories of traumatic events. But the process also plays a role in normal brain activity - allowing people to distinguish between trivial and significant events and to store the latter in the long term memory.

The study looked at the effects of the stress hormone noradrenaline - known as norepinephrine in the US - in the brains of laboratory mice. Emotional stress is known to have a strong effect on the brain's ability to lay down memories.

When injected into the mouse brain, the chemical caused the phosphorylation of type 1 glutamate receptors (GluR1) in brain cells connecting to the hippocampus and amygdale, two regions of the brain closely associated with emotional memory formation.

The team suggest that these modifications are important in the process of long term potentiation (LTP), which eases the passage of signals across synapses - the gaps between adjacent brain cells. Although the process is still poorly understood, LTP is thought to be central to memory formation.

The study looked at the release of natural noradrenaline in the brains of mice exposed to a stressful situation through being put in a cage containing traces of the urine of foxes - a common predator of mice. The researchers also returned the mice to the cages a few days later: mice genetically modified to have defective GluR1 receptors moved around the 'new' cage much more indicating that they had little memory of their previous spell in that environment.

Roberto Malinow, head of the laboratory's neurobiology group and one of the paper's authors, said the mouse brain was essentially the same as that of humans and the same mechanism was likely to be at work in human memory. The findings are just one piece of a larger puzzle, said Malinow, but they may help to produce a treatment for those suffering from disorders like PTSD.

"We've identified one potential therapeutic target. It may be possible to develop drugs that could prevent too many brain receptors from being added or that might remove them once they are there" - Roberto Malinow.

Jim McGaugh, of the Center for Neurobiology of Learning and Memory at the University of California, Irvine, confirmed that the study complements current understanding of the effects of noradrenaline in humans.

'The findings fit well with the extensive prior evidence that the release of epinephrine (noradrenaline) in the periphery and norepinephrine in the brain play an important role in regulating the strength of memories of emotionally arousing experiences,' McGaugh told *Chemistry World*. 'Their findings that norepinephrine phosphorylates GluR1 and facilitates the delivery of GluR receptors into synapses helps to increase understanding of possible mechanisms underlying the influence of emotion on memory.'

Текст № 10

Men More Likely to Have Problems with Memory and Thinking Skills

When it comes to remembering things, new research shows men are more likely than women to have mild cognitive impairment, the transition stage before dementia. The research will be presented at the American Academy of Neurology 60th Anniversary Annual Meeting in Chicago, April 12–19, 2008.

“This is one of the first studies to determine the prevalence of mild cognitive impairment among men and women who have been randomly selected from a community to participate in the study,” said study author Rosebud Roberts, MD, with the Mayo Clinic in Rochester, MN, and member of the American Academy of Neurology. Mild cognitive impairment can also be described as impairment in memory or other thinking skills beyond what’s expected for a person’s age and education.

For the study, 2,050 people living in Olmsted County, Minnesota, who were between the ages of 70 and 89 were interviewed, examined, and given cognitive tests. Overall, 15 percent of the group had mild cognitive impairment.

The study found men were one-and-a-half times more likely to have mild cognitive impairment than women. The finding remained the same regardless of a man’s education or marital status.

“These findings are in contrast to studies which have found more women than men (or an equal proportion) have dementia, and suggest there’s a delayed progression to dementia in men,” said Roberts. “Alternately, women may develop dementia at a faster rate than men.”

The study was supported by grants from the National Institutes of Health and the Robert H. and Clarice Smith and Abigail Van Buren Alzheimer’s Disease Research Program.

The American Academy of Neurology, an association of over 21,000 neurologists and neuroscience professionals, is dedicated to improving patient care through education and research. A neurologist is a doctor with specialized training in diagnosing, treating and managing disorders of the brain and nervous system such as Alzheimer’s disease, epilepsy, multiple sclerosis, Parkinson’s disease, and stroke.

ТЕКСТ № 11

Music moves brain to pay attention, Stanford study finds

Using brain images of people listening to short symphonies by an obscure 18th-century composer, a research team from the Stanford University School of Medicine has gained valuable insight into how the brain sorts out the chaotic world around it.

The research team showed that music engages the areas of the brain involved with paying attention, making predictions and updating the event in memory. Peak brain activity occurred during a short period of silence between musical movements - when seemingly nothing was happening.

Beyond understanding the process of listening to music, their work has far-reaching implications for how human brains sort out events in general. Their findings will be published in the Aug. 2 issue of *Neuron*.

The researchers caught glimpses of the brain in action using functional magnetic resonance imaging, or fMRI, which gives a dynamic image showing which parts of the brain are working during a given activity. The goal of the study was to look at how the brain sorts out events, but the research also revealed that musical techniques used by composers 200 years ago help the brain organize incoming information.

“In a concert setting, for example, different individuals listen to a piece of music with wandering attention, but at the transition point between movements, their attention is arrested,” said the paper’s senior author Vinod Menon, PhD, associate professor of psychiatry and behavioral sciences and of neurosciences.

“I’m not sure if the baroque composers would have thought of it in this way, but certainly from a modern neuroscience perspective, our study shows that this is a moment when individual brains respond in a tightly synchronized manner,” Menon said.

The team used music to help study the brain’s attempt to make sense of the continual flow of information the real world generates, a process called event segmentation. The brain partitions

information into meaningful chunks by extracting information about beginnings, endings and the boundaries between events.

“These transitions between musical movements offer an ideal setting to study the dynamically changing landscape of activity in the brain during this segmentation process,” said Devarajan Sridharan, a neurosciences graduate student trained in Indian percussion and first author of the article.

No previous study, to the researchers’ knowledge, has directly addressed the question of event segmentation in the act of hearing and, specifically, in music. To explore this area, the team chose pieces of music that contained several movements, which are self-contained sections that break a single work into segments. They chose eight symphonies by the English late-baroque period composer William Boyce (1711-79), because his music has a familiar style but is not widely recognized, and it contains several well-defined transitions between relatively short movements.

The study focused on movement transitions - when the music slows down, is punctuated by a brief silence and begins the next movement. These transitions span a few seconds and are obvious to even a non-musician - an aspect critical to their study, which was limited to participants with no formal music training.

The researchers attempted to mimic the everyday activity of listening to music, while their subjects were lying prone inside the large, noisy chamber of an MRI machine. Ten men and eight women entered the MRI scanner with noise-reducing headphones, with instructions to simply listen passively to the music.

In the analysis of the participants’ brain scans, the researchers focused on a 10-second window before and after the transition between movements. They identified two distinct neural networks involved in processing the movement transition, located in two separate areas of the brain. They found what they called a “striking” difference between activity levels in the right and left sides of the brain during the entire transition, with the right side significantly more active.

In this foundational study, the researchers conclude that dynamic changes seen in the fMRI scans reflect the brain’s evolving responses to different phases of a symphony. An event change - the movement transition signaled by the termination of one movement, a brief pause, followed by the initiation of a new movement - activates the first network, called the ventral fronto-temporal network. Then a second network, the dorsal fronto-parietal network, turns the spotlight of attention to the change and, upon the next event beginning, updates working memory.

“The study suggests one possible adaptive evolutionary purpose of music,” said Jonathan Berger, PhD, professor of music and a musician who is another co-author of the study. Music engages the brain over a period of time, he said, and the process of listening to music could be a way that the brain sharpens its ability to anticipate events and sustain attention.

According to the researchers, their findings expand on previous functional brain imaging studies of anticipation, which is at the heart of the musical experience. Even non-musicians are actively engaged, at least subconsciously, in tracking the ongoing development of a musical piece, and forming predictions about what will come next. Typically in music, when something will come next is known, because of the music’s underlying pulse or rhythm, but what will occur next is less known, they said.

Having a mismatch between what listeners expect to hear vs. what they actually hear - for example, if an unrelated chord follows an ongoing harmony - triggers similar ventral regions of the brain. Once activated, that region partitions the deviant chord as a different segment with distinct boundaries.

The results of the study “may put us closer to solving the cocktail party problem - how it is that we are able to follow one conversation in a crowded room of many conversations,” said one of the co-authors, Daniel Levitin, PhD, associate professor of psychology and music from McGill University, who has written a popular book called *This Is Your Brain on Music: The Science of a Human Obsession*.