Research Progress of University Psychology Based on Big Data
------discovery, challenges and opportunities

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Abstract. Big-Data, also known as mass data, refers to a large scale of data involved, which can not be intercepted, managed, processed and collated into information that can be interpreted by human beings in a reasonable time\(^1\). It is widely believed that big data only refers to that the scale of data is large. In fact, this is not the case. Big data needs to meet three characteristics: large capacity, fast speed, and rich types. Only when these three conditions are met concurrently can it be called big data\(^2\).

The Outline for the Promotion of Big Data Development issued by the State Council in 2015 defines big data as follows: Big data is a collection of data characterized by large capacity, multiple types, fast access speed, and high application value. It is developing rapidly to be the new-generation information technology and service industry that collects, stores and correlates large amounts of data with dispersed sources and diverse formats, so as to discover new knowledge, create new value, and enhance new capabilities\(^3\).

1. Encounter between psychology and contemporary university students
In the past few years, the probability of university students' psychological problems has become higher and higher, drawing more and more attention from the whole society. And the rapid development of the Internet and information technology has led more and more researchers to the study of psychological behavior based on large data on the Internet. Undoubtedly, big data provides a new perspective for psychology and pedagogy research. In China's first research report on the post-90s consumer groups and the campus market, Post-90s Generation on the Internet ---Post-90s University Students Digital Life Research Report, the university students group is living “a linked life”, which means surfing the Internet anytime and anywhere, and life is highly dependent on the network\(^4\). It is true that university students are experiencing all kinds of conveniences and benefits brought by massive data: Learning academic knowledge, buying products and services, learning about society at home and abroad, and seeking development. However, with the same conveniences, immature university students are also obtaining misleading information, buying useless products and services, and being misguided by pornography and violence. Therefore, there is no absolute good or bad thing in the world. While enjoying conveniences, one is also facing the challenges. In such cases, big data is useful to study and analyze emotional problems of contemporary university students.

2. The delivery of questionnaire on university students' emotions
   (1) Investigation delivery
Emotion is an important research object in psychology, and it is also the most fruitful research field that closely integrates with big data so far. I have conducted a questionnaire at universities in Dalian. Prior to this, I conducted a series of surveys, and survey results show that 29% of university students have different degrees of depression, of which 20% have mild depression, 7% have moderate depression, and 2% have severe depression. They are sometimes passionate, sometimes negative, languid, and silent. Emotional fluctuations, especially negative emotions, are harmful to university students, making it difficult for them to build a harmonious relationship between others and themselves. It would also cause damage to their creativity and lead to destructive or aggressive behaviors, personality fragmentation, and even suicide. According to relevant data analysis, the number of university students committing suicide accounts for 25% of the total number of suicides in China every year. Suicide has become one of the extreme ways for contemporary university students to solve negative emotions.

I sent 442 questionnaires to university students and collected valid answers.

**Figure 1** Survey on life satisfaction of university students (Single choice)

| Option          | Number | Percentage |
|-----------------|--------|------------|
| Great Satisfaction | 133    | 30.09%     |
| Quite Satisfied  | 179    | 40.5%      |
| So so            | 96     | 21.72%     |
| Dissatisfaction  | 34     | 7.59%      |

The number of qualified voters: 442

**Figure 2** The frequency of negative emotions among university students (Single choice)

| Option       | Number | Percentage |
|--------------|--------|------------|
| Always       | 34     | 7.69%      |
| Often        | 42     | 9.5%       |
| Occasionally | 225    | 50.9%      |
| Not often    | 141    | 31.5%      |

The number of qualified voters: 442

Although half of university students in the data only occasionally have some negative emotions, nearly 17.19% of them often or always have negative emotions. Compared with those university students who occasionally have negative emotions, they often have more difficulties in their daily life, study and work. Most of them have poor regulation of their emotions and are prone to be affected by their emotions for too long.
According to the survey, 47.96% of university students' negative emotions come from social interpersonal communication and economic pressure. Emotional reasons only rank the second place, accounting for 43.67%. The distress of 36.43% students is from that universities have set strict requirements on students’ academic performance. If one fails the examination and cannot pass the make-up examination, and when relevant course credits are accumulated to a certain extent, he/she faces a risk of downgrade. For students with below-average academic performance this is the main pressure source.

38.46% of university students are often in the mood of depression, and 36.43% are facing anxiety and irritability. These two emotional states are common among university students. These negative emotions occur when they encounter setbacks in study, work and life. Experiments has shown that moderate anxiety can keep students in a moderate state of tension, and thus promote learning due to a high degree of concentration. However, excessive anxiety often makes university students feel extremely nervous, fearful, restless and confused.

The sources of university students' negative emotions (Multiple choice)

| Option       | Number | Percentage |
|--------------|--------|------------|
| Study        | 181    | 36.43%     |
| Emotion      | 193    | 45.67%     |
| Family       | 81     | 18.33%     |
| Other        | 212    | 47.96%     |

The number of qualified voters: 442

Types of negative emotions of university students (Multiple selection)

| Option               | Number | Percentage |
|----------------------|--------|------------|
| Anger                | 128    | 28.96%     |
| Melancholy           | 170    | 38.46%     |
| Sad and sad          | 93     | 21.04%     |
| Anxiety and irritability | 161  | 36.43%     |
| Fear                 | 39     | 8.82%      |
| Sense of shame       | 46     | 10.41%     |
| Lack of security     | 84     | 19%        |
| Other                | 116    | 26.24%     |

The number of qualified voters: 442

The duration of negative emotions of university students (Single choice)

| Option                      | Number | Percentage |
|-----------------------------|--------|------------|
| 5-10 minutes                | 177    | 40.06%     |
| Half an hour to an hour     | 167    | 37.78%     |
| One to two days             | 70     | 15.84%     |
| More than two days          | 28     | 6.33%      |

The number of qualified voters: 442
It is worth noting that one in five students have negative emotions overnight. Close heed should be paid to this phenomenon because when negative emotions last too long, students are prone to have psychological problems.

Negative emotion regulation ability of university students (Single choice)

| Option       | Number | Percentage |
|--------------|--------|------------|
| Very good    | 176    | 39.82%     |
| Preferably   | 154    | 34.84%     |
| Commonly     | 86     | 19.46%     |
| Not good     | 26     | 5.58%      |

Figure 6 Negative emotion regulation ability of university students

It can be seen that 39.82% of students think that they have good emotional regulation ability, and they usually control and regulate their emotions by facing them directly, experiencing and adjusting them. Only about 6% of students think that their emotional regulation ability is not good, and they often get stuck in certain problems or feel sad for a long time because of trivial matters. At the same time, however, only 34.84% and 19.46% of university students have “good” and “general” emotional adjustment ability. Everyone's self-regulation ability is different, and it is normal that they have various kinds of emotions. Therefore, universities should pay more attention to students' emotional health problems and attach importance to cultivating students' psychological control ability.

(2) Survey results

University students still have not broken away from the influence of family of origin, but they intend to create a new family. Although they are gradually becoming mature, they still lack the ability to realize it. Therefore, they are in a well-meaning transition period. During this period, emotional fluctuations could be dangerous for students if they have no access to external assistance. For instance, several serious cases occurred each year, and suicide is also a nerve-wracking problem in colleges and universities.

There are cases showing that long-term negative emotions can cause irreparable damage to the mind of university students, and even seriously, they may lead to personality splitting. In these cases, there are several types of disparities between students’ external and internal performance. One type is that they are seemingly arrogant, but in fact they feel extremely inferior. They use pretended pride to cover up their own inner anxiety, fear, inferiority and lack of security. One type is that they apparently belittle an object or a person, but in fact they extremely worship and love it internally. There is also one type that is quite the opposite to the above type. They ostensibly praise an object or a person, but they hate it very much internally. These disparities would pose a great threat to the personality and value system of university students in the long run.

3. Psychological research on big data

Post-90s university students, a generation that uses the Internet frequently and excellently, are highly dependent on the Internet. Since most of students use campus WiFi, their network behaviors can be easily tracked. If there is sensitive words tracking on the internal network of universities, is it possible to predict problems and solve them in advance?

According to the China Youth Daily survey, 75.0% of the respondents indicated that there are many young people with “network autism” around them, of which 22.9% said “quite a lot” and 34.4% admitted that they have “network autism”. Online self-exposure can attract some attention in a certain degree, which could effectively eliminate loneliness. But too much exposure is like "exposure addiction", which can be problematic.

A number of studies find that some objective behaviors, such as giving a like, offer the possibility to automatically predict computer models of user personality or other attributes. The predictive
accuracy of the open personality dimension is almost the same as that of the standardized personality test. The predictive accuracy of sexual orientation and political attitude towards democracy and liberalism is 88% and 85% respectively. The accuracy rate is higher than that of users' close friends' judgment through questionnaires.

Therefore, when students frequently use negative words such as depression, tedium, sadness, listlessness, loss, boredom, depression, melancholy, loneliness, inferiority, etc., campus network monitoring can send words with positive implication, such as beautiful, generous, lovely, handsome, selfless, self-discipline, persistence, innovation, ambition, humor, understanding, modesty, self-confidence, innovation, pragmatic, brave, open-minded, optimistic, love, ideal. The monitoring system can filter and summarize relevant vocabularies in this way.

4. Practical application of big data with suicide as an example

In 2015, 780,000 people died of suicide worldwide. The World Health Organization estimates that by 2020, about 1,530,000 people will die of suicide, with an average of one suicide every 20 seconds and one attempted suicide every 1 to 2 seconds. Suicide is the fifth leading cause of death in China, and the main cause of death among people aged 15-34. And suicide due to depression accounts for the largest proportion. In 2015, the total population of depression in China was 54 million, accounting for 5.4% of the total population.

A user of Weibo died on March 18, 2012. The last Weibo on the day of his death became the biggest "hole"; Now it has accumulated more than 1.6 million messages, and the number of new messages is increasing at a rate of 2,000 a day, which means that 500 to 600 people express despair every day, and most of them have suicidal tendency. Most of the suicidal emotions expressed on Tree Hole are young people at the age of 16 to 26. and the ratio of male to female is 1:3, while the ratio for people in depression is 1:2.

Huang Zhisheng, a professor at Vrije University Amsterdam, is the founder of the recently popular "AI tree hole rescue group" on the Internet. He has been engaged in artificial intelligence research for more than 30 years. In 2010, Professor Huang began to pay attention to the application and combination of mental health and artificial intelligence, and made knowledge maps according to the needs of doctors. But slowly, he found that the most urgent thing is to prevent suicide from happening and save lives.

Huang Zhisheng officially launched the “Tree Hole Action” in the 500-person artificial intelligence group. He called on everyone to search for suicides on the Internet through artificial intelligence, find would-be suicides nearby by interpreting social media information, and stop the implementation of suicide. He built a group which composes of several experts in the field of artificial intelligence and named it "Tree Hole Rescue Group." "Tree Hole Robot 001" developed by Huang Zhisheng was launched. This is a computer program. After clicking the button to start searching, the program automatically identifies the person who is ready to suicide under the tree hole. On the second day of the program's launch, the first monitoring report was successfully generated.

In fact, as early as 2016, Zhu Yanshao, a researcher at the Institute of Psychology, Chinese Academy of Science, began to use social network (Sina Weibo) to find users with suicidal intentions so as to conduct psychological counseling and theoretical transmission through private message. At first, there were many difficulties in carrying out the work, but it had a far-reaching impact on the development of social network suicidal intervention.

According to Zhu Yanshao's research, the analysis of suicide prevention in social media shows that: (1) Users with high suicide risk will show unique behavioral and linguistic features when using social media, i.e. low social activity, high self-attention, preference for negative, death-related or religious vocabulary, and less use of positive vocabulary; (2) A suicide risk prediction model based on social media behavior and linguistic features can effectively identify would-be suicides. The group with high suicide possibility is less socially active on Weibo than the group with low suicide possibility, and is more active at night (10 pm to 6 am). Low-level social interaction is considered to be one of the important manifestations of high suicide risk; Psychiatric reports also reflect a strong association
between suicide and sleep disorders at night\textsuperscript{13,14,15}.

Based on those findings above, we can develop a high-risk vocabulary system of colleges and universities. When students retrieve such high frequency words from the Internet, we can first "intervene" the information. In 2014, there was a research on emotional contagion, which compared 700,000 dynamic information on Facebook. The experiment was conducted as follows: one group was given more positive emotions and the other group negative emotions. It is found that users who received positive information became more active, while users who received negative information became more negative\textsuperscript{16}. Therefore, we can put more positive information on the campus network portal of students who use negative and depressive words frequently, and make further observation. If students get positive suggestions, but are still not more active, psychological counseling teachers should take the initiative to interview them and investigate according to the actual situation. As for students, we must pay special attention to the protection of data. First of all, we should pay heed to privacy when collecting data. We should concentrate on facts but not peculiar individuals, and not adopt a harsh preaching way. We can not make students feel "monitored", which contradicts our original intention. And making students feeling unpleasant is not conducive to further data collection. What’s more, teachers cannot prevent students from obtaining information. After all, in an era of information explosion, students can search for any information they want. We should give more care and advice to students rather than criticism.

Facebook launched artificial intelligence to prevent suicide in 2017. Facebook has accumulated a large amount of personal information of customers, so it is much easier to intervene suicide in countries where Facebook is available than in China. And since data collected domestically is only open data on the Internet, it is hard to obtain individual privacy such as suicidal inclination in China. It is probable that most people would take an active attitude towards such a high-risk vocabulary system on campus since saving lives is the highest ethic in Chinese culture.

5. Conclusion
In recent years, there has been more and more psychological researches centering on network big data, which also has shown great development potential and vitality. Significant progress and major breakthroughs have been made in research methods. Big data could be used to discover ongoing suicides and emotional problems such as anxiety and depression, and thus effectively avoid tragedies. It is an innovative application that links science and technology, and is also beneficial to colleges and universities. It is useful to use big data to screen students' negative vocabulary online, but we should also pay attention to students' privacy. In my opinion, big data is like water in a transparent container. Whether big data it is used or not, the water is an objective existence. We should take care of relevant containers so that the water does not become contaminated and dry.

Although big data cannot reduce negative emotions such as suicidal depression and anxiety, existing records show that big data can save nearly 50 lives every month. About 600 to 800 suicides have been prevented in this way every year. If we apply it in colleges and universities, more skilled and effective precipitation of information may save more lives. For domestic researchers, many related fields are still in the process of exploration, so it is inevitable to “cross the river by feeling the stones”.

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