

**Chiba University Leading Research Promotion Program
Online International Seminar (in English)**

**Positive Political Psychology International Seminar 3:
Social Fairness and Wellbeing
Measuring Wellbeing through Social Media Language**

Date & Time : 24 Mar. 2023(Fri), Japan

Abstract: This is a research essay based on the transcript of the third meeting of seminar serials on “Positive Political Psychology International Seminar: Social Fairness and Wellbeing”. Professor Lyle Ungar (Professor of Computer and Social Science, University of Pennsylvania) who is well versed in computer science and whose cutting-edge research combines scientific and technological directions with positive psychology, addressed how to use social media language from people to better understand what wellbeing is and how to measure it during his presentation entitled “Measuring Wellbeing through Social Media Language”. Then discussion was initiated, and research ideas were exchanged afterwards.

Moderator

•**Prof. Hikari Ishido (Chiba University)**

Panelists

•**Prof. Lyle Ungar (University of Pennsylvania)**

•**Prof. Masaya Kobayashi (Chiba University)**

•**Assoc. Prof. Xiang Li (Chiba University)**

•**Dr. Xiaofang Zhang (Chiba University)**

•**Mr. Alfonso Torrero (Universidad Autónoma Metropolitana)**

Organizer: Chiba University Global Fair Society Program

Introduction (by Prof. Hikari Ishido)

This online seminar is entitled “Positive Political Psychology International Seminar 3: Social Fairness and Wellbeing”. This is our third meeting for the “**Positive Political Psychology International Seminar**” series focusing on social fairness and wellbeing. The focus of our research group, **Chiba Studies on Global Fair Society** is centering on challenging and overcoming unfair practices on all scales, investigating issues such as gender inequality, widening income gaps, migration, and the collapse of regional and marginal communities, both in Japan and around the world. In doing so, we seek to identify the development, transformation, and limitations of existing welfare state models and provide empirical evidence for how a fair society can be achieved in the 21st century. Our special emphasis will be placed on “wellbeing” and values because fairness is intrinsically related to people's subjective judgement. Objective equality does not always guarantee a subjective feeling of fairness. The vision of a fair society should include both objective fairness and subjective sense of fairness. We are planning to broaden our networks of academics across the globe.

Today we will have Professor Lyle Ungar (Professor of Computer and Social Science, University of Pennsylvania) to talk about how to use social media language to better understand and measure wellbeing. Then Professor Masaya Kobayashi will initiate the discussion so that other participants could join in and exchange research ideas afterwards.

Measuring Wellbeing through Social Media Language (Presented by Professor Lyle Ungar)

What I want to talk about is how we can use language to better measure and understand well-being, which I think is a big topic and very important. I'm going to talk very much about measuring well-being in English and America today, but we're starting to do the same thing in China, and Japan, and other countries. And one of the reasons is that now I think the techniques that we've slowly developed in English in America can be applied across the world. I think it helps to both major well-being and understand it. And one of the questions I won't talk about, but I'm most interested in is how do the contributing factors to well-being differ around the world? I think cultures are not all the same. And we need to understand how people differ. My goal is simple but difficult to use language from people to better understand what well-being is and how it varies across different individual people and across different cultures.

We look at language at lots of levels. We usually look at single messages, one text message, one tweet, one Facebook post, to see if people are happy or sad or excited. We also look at conversations which I won't talk about today. We will look at text messages. How do people talk differently to their husband, or wife, or to a stranger? How do depressed people talk differently? And I will talk about traits that people have, to see if they're extroverted or introverted, neurotic or well adjusted, depressed or not depressed. And we can measure it in much lower larger level and having access to billions of tweets. There are variations across the US or across the world. And how do people show their well-being different? How does it change over time? We watch during COVID, as well-being went way down, and is now happily coming up again. People are happier now that COVID is gone, not surprisingly, but we can get more detailed measurement.

As a psychologist and a computer scientist, I'm going to talk about tools, and language as a tool for measuring things. Over time, people start with little telescopes and build bigger ones and bigger ones. In some sense, I want to build telescopes and measurement tools to understand people through their language which I think is a great way to understand people. When you talk to someone, when you send a text message, you reveal something about what you're feeling and what you care about. People rarely say that they are feeling so depressed, or they really

What's the opposite of extraversion? Something and one is not better or worse but a different personality. The opposite is introversion (Figure 2). What do American introverts talk about? Interesting, we can see lots of Japanese culture such as “manga”, “anime”, even the word “Japanese”. It is that Japanese culture is very popular among introverted Americans. “Drawing”, “reading”, “books”, these are introvert activities that you could do by yourself, working on computer and the internet. Introverts also tend to use hedge words, for example, “apparently”. They tend to say, “I'm apparently doing very well”, rather than “I'm positive, I'm doing very well”, which is what extroverted to be sure of yourself. It shows that introverts like reading Wikipedia. But unfortunately, introverts are a little more inclined to be depressed than extroverts. So mostly, introversion is good academics who tend to do science while extraversion is likely to be salespeople who must deal with people for a living. It might make sense that if you're scholarly, you need to be a little introverted because you need to enjoy time on your computer and reading books, and if all you want to do is spend time with people, you're not going to be a good researcher. We could notice that we see something about the life of introverts and extroverts from the language they use.

Here is another example to show how word use captures personality (Figure 3). What do neurotic Americans talk like? First, they swear, which is a very American trait. Most of the world doesn't swear as much as Americans. They are “sick of” things. I statistically group together pairs of words that show up together such as “sick of”, “my head”. And “tired of”, “why do I”, “leave me”, these multiple word expressions give more clarity. In English, “sick” means that you're not feeling well, but “sick of” means that you're tired of it, you don't like it. So, more neurotic people are, the more they're swearing. But even they're alone and bored, they rarely say the word of depression or depressed as it's not very socially acceptable to say I'm feeling depressed. But if they do say it, they're more likely to be neurotic.

The opposite of being neurotic is being well adjusted (Figure 4). What do well adjusted Americans talk about? As we know, some things that Americans will say over and over are very religious. You can see “the lord”, “god is good”, or “in Christ”, “the church”, “praise”, which means in general, religious Americans are more well-adjusted, more agreeable. It's not so much true in Europe, which is much less religious or China, or probably Japan, a few parts of the world.

More Neurotic

Less Neurotic



Figure 3

Figure 4

And what you can see are, “soccer”, “baseball”, “lakers”, words of sports. So, well-adjusted Americans also talk a lot about sports, not just sports and “the gym”, where we know that exercising is good for you. Exercising is almost as good for treating depression as taking antidepressants. People who are watching sports are less neurotic. I have a hypothesis for the reason that is watching sports is often something you do with other people, a way to connect,

and something you talk about to make connections. And we still need to do more studies to understand it, but it seems at least plausible is an interesting hypothesis. That involvement in sports is a way of getting out of the house, meeting other people connecting for both introverts and extroverts.

We can correlate how well our language predicts five factors of personality: openness, conscientiousness, extraversion, agreeableness, neuroticism, comparing with how well a friend will predict. If you have a friend on Facebook fill out the survey question for you, how good a job can your friend do in estimating your personality from a questionnaire? And the answer is the Facebook language computer model is just as good as your friend in terms of estimating your personality. It's not very accurate, but neither is your friend, still to tell something about personality.

What does this say about well-being? We have a website called **Authentic Happiness** where we've had about a million people come. On the website, they can take questionnaires, and they can share Twitter if they wish. With their permission, we can correlate the language of their tweets with what they said when they filled out their questionnaires (Figure 5). In America, positivity is highly correlated with excitement. But we can see that now this doesn't have to be the case. They can be happy, but calm and peaceful. Globally, positive relationships are one of the two things that matter for well-being. What do people who score high on the surveys with positive relationships? We can see "love", "birthday", "my", "you", "friends", "family", "baby", "daddy", which relate to relationships in America. They can be different across countries, but you can see similarities. The other big component of well-being is meaning or accomplishment. In America, but not in much of the world, lots of meaning comes from believing in "god", and Jesus, and having "blessings" and "faith". And accomplishment comes from being "proud", "winning", doing a "great" job, and your "daughter" and "baby", the amazing people you're with. What do we see? We see positive emotion of love and being happy or positive relationships, and meaning through religion in America, and accomplishment by being proud of both themselves and family, which are all showing up in language. So far, we've taken surveys correlated with language, but it means now we can also look at your language in your text messages, in your tweets, and say something about your well-being.

Predicting Wellbeing: PERMA

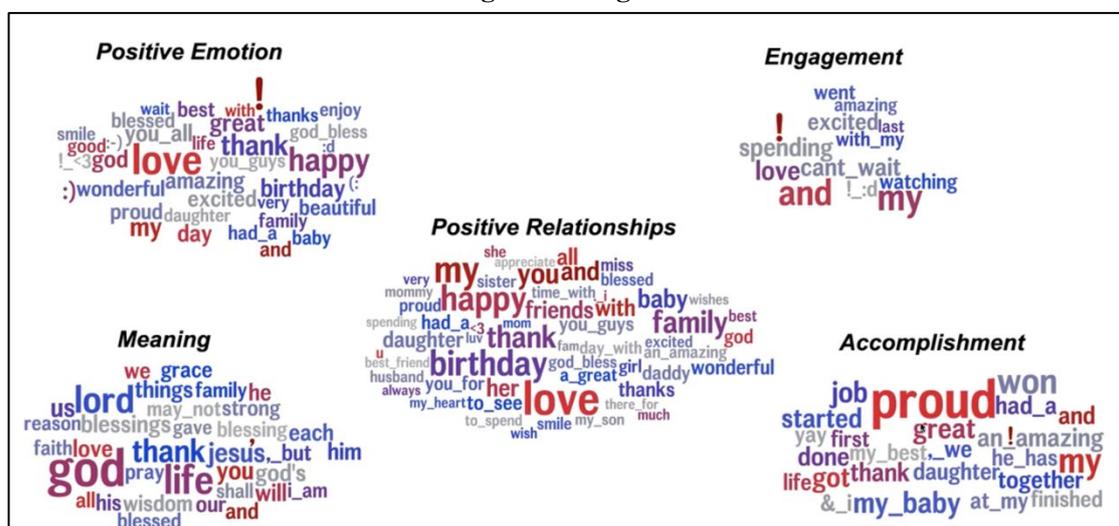


Figure 5 (Word Well-Being Project: wwbp.org)

We can also look at the other side (Figure 6), people who score low, the negative emotion of “sick”, “hate”, “tired of”, even swear words. Before these surveys, I thought that the word “people” would be a positive word or relationship word. But that's not the way it's used on Twitter. Positive words of people are “friend”, “family”, “daughter”, “wife”. But negatively, we can see “people are annoying”, “people are stupid”. “People” in English is a distancing word, not a close word. People is under people, which means this is negative. Another example is the word, “I”. For example, if you're talking negatively, you might say “I am tired”, “I don't see meaning in life”, or “I don't like people”. But positively, there should be much more ‘we,’ much less ‘I’. That's one of the universal examples. Focusing on yourself is mostly not a good thing to do for well-being, which is a measure of lack of well-being.

Predicting Wellbeing: Lack of PERMA

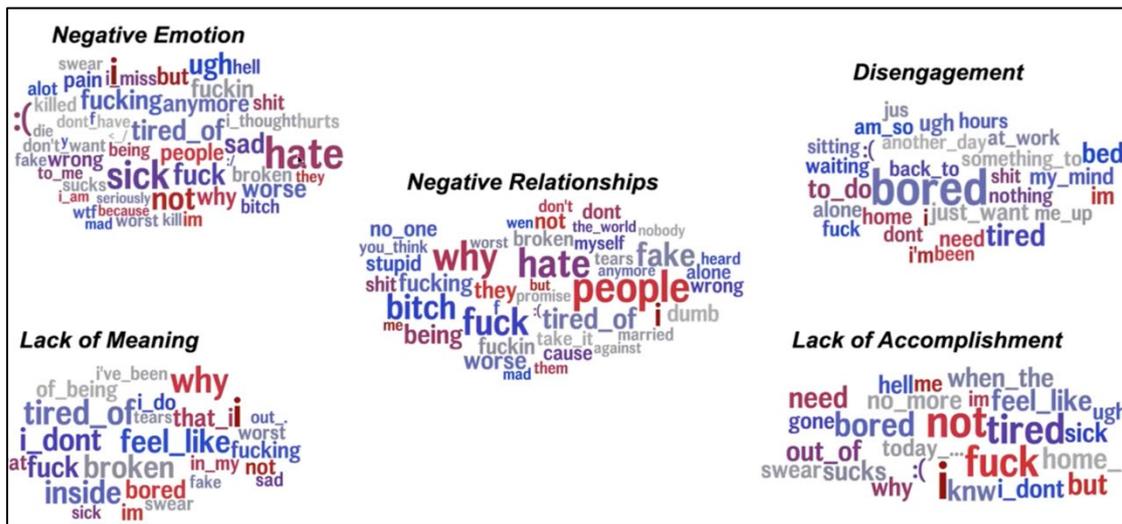


Figure 6 (Word Well-Being Project: wwbp.org)

Therapists often suggest that if you're depressed, go call up a friend to do something, and think about someone besides yourself. We can see this in the language of lack of well-being. Here is another example from the Authentic Happiness website. We have people take questionnaires to measure their character strengths, such as teamwork, leadership, kindness, and zest (Figure 7).

Predicting Wellbeing via Character Strengths

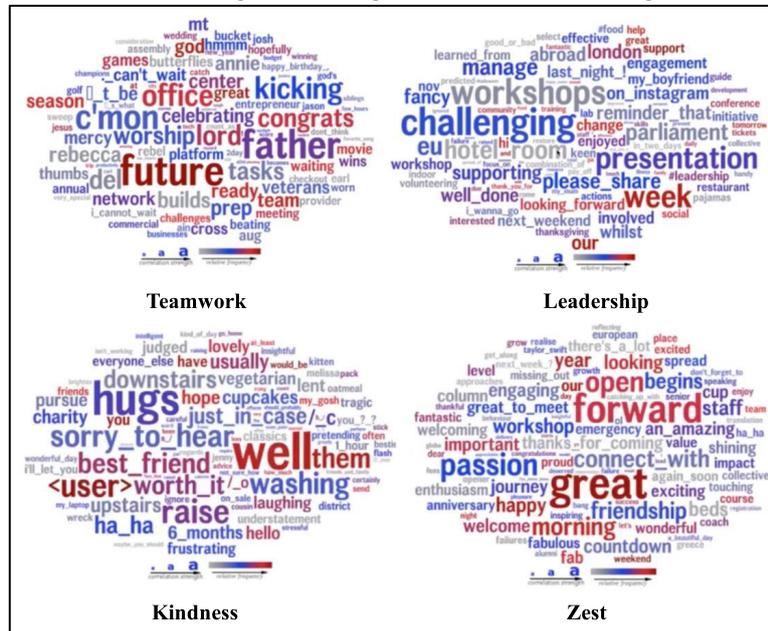


Figure 7 (Word Well-Being Project: wwbp.org)

People who score high for teamwork, talk about the “future”, “office”, religion, and networking. People who score high on leadership talk about managing things or “challenging”, doing “presentation”, who are “looking forward” and tend to travel more. Contrast that with different character strengths, people who are high on kindness talk about their best friends, and they're sorry to hear the bad things that have happened to someone else. They send hugs to people, bring in cupcakes. They are people who are high on zest, thinking about wonderful in the morning and countdown until things are happening, and looking at beginning. We can see these different kinds of character strings in language, which is a way to measure.

The second part I want to talk about will be depression. I want to try and look at measuring depression or well-being with the language people use. With the same way on Authentic Happiness, we ask people permission to collect their Facebook posts, have them take a standard depression measure with the questions that are asked by doctors or a psychologist to find the correlation (Figure 8). We've used a method called **Latent Dirichlet Allocation**, a topic method, that clusters words tend to go together automatically.

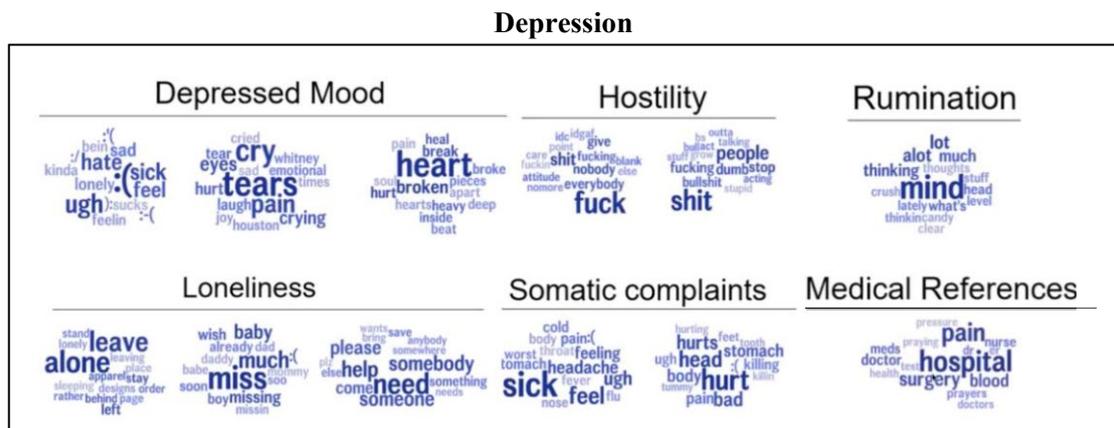


Figure 8

We see words indicating sadness, such as “crying”, “tears”, “broken heart”. We see words of anger. We know depressed people tend to be angrier, more hostilities. And we can see the word of “people” again, which is negative on Facebook and Twitter. We see words of loneliness, which go a lot with depressed people tending to be lonely. We see the words of somatic complaints, “sick”, “headache”, “body hurting”, all of which are known symptoms. These vary across cultures. I've looked mostly at the US and China. In America, depression shows up lots with depressed mood and loneliness where people tend to have more psychological aspects of depression. In China, people go to their doctor saying “my head hurts”, or “I'm sick”, “I'm having a headache”, “I'm feeling pain”, where they have more somatic body symptoms of depression. We can also ask as a third culture I haven't studied, for example, in Japan, which is different from young people versus old people. And I see in India, this is changing. Young Indians look more like Americans while old Indians look more like Chinese people. I worried that if we go cross-culturally, and we develop all our skills in America, we forget about things that are true for Americans but truer for Chinese and maybe other cultures. As for medical references, we can see people talking about “hospital” and “pain”.

Let's try and understand more about what we can get in detail with different facets, pieces of depression (Figure 9). I'm going to show correlations of language with two sets of questions. One set of questions about low mood, “I'm often in the dumps”, “I often have frequent mood swings”, or the opposite of “I seldom feel blue”. These are low mood measures. Then I will

concerned feelings about people less fortunate than me, it is good empathy. And if I try to imagine how other people feel, it is also good empathy. But if I tend to make other people suffering my own, it should be bad empathy. So simply speaking, we have good empathy of caring about people, and bad empathy of feeling other people's pain.

Here's the American sample of beneficial and depleting empathy (Figure 13&14). For beneficial empathy, we can see the words such as “wonderful”, “family”, “children”, and “blessed”, which are all good things. What's bad empathy look like? First, it is about “I” and “me”. I'm supposed to be concerned with you, but I've caught your pain. And now instead of worrying about you, I'm feeling about “me”. We can also see “people” and “pain”. They are things that may look good, “my sister” or “my friend”, and “the tears in the laughing”, but they are also mood swings and depressed mood.

Beneficial Empathy

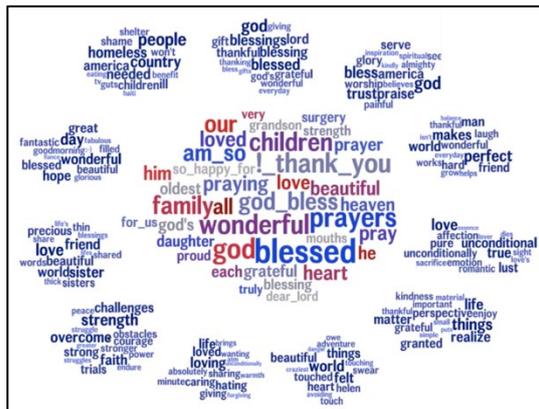


Figure 13

Depleting Empathy



Figure 14

Some things are good but much more complicated this empathy. For example, if you are a therapist or a doctor, or any helping profession, and when you have too much feeling someone else's pain, you burn out, get tired and you can't do it anymore. You can't go in and deal with people dying of cancer every day and feel their pain. If you feel the pain of every cancer patient, you end up feeling about “I” and “me”, which is not good. We can tease apart these pieces.

As showed in Figure 15, we can also ask these same people survey questions, people with compassion, the good empathy, less time volunteering, more time giving money to charity, less missing work, less drinking on work nights, which mostly is not healthy and less stress. People who feel other people's pain, more time volunteering to help. That's maybe good but doing it less giving money, more missing work, more drinking at night, worse health and much more stressed. And if you're in a stressful job dealing with people's pain, if you're a psychotherapist, if you're a doctor, you really want to be over on the compassion, caring, not on the feeling someone's pain.

**Empathy as Revealed in Behavior
(Controlling: age, gender, beneficial /depleting)**

	beneficial	depleting
time volunteered	.02	.06*
money donated	.11**	.001
missing work health	-.05*	.14**
drink work nights	-.10**	.10**
general health	.05*	-.08**
stress	-.11**	.30**

Figure 15

Last, I want to shift to talk about measuring whole regions as measuring individuals has been much discussed. The US is broken up into about 3000 counties. About 2000 of them have enough people to actually measure data. Many of them are almost empty farmland. America is very big and very empty. So, it's about a sample size of 2000 counties. We collected Twitter from public pieces and mapped it to the county. Then we take data collected by the government, the Centers for Disease Control, our main Medical Group, or the US Department of Commerce, Department of Census, which does a survey every 10 years. We have government collected data on health outcomes and well-being outcomes, life satisfaction, Gallup surveys, and other ones in the government. We can now take the language used in the county on Twitter and satisfaction with life, or mortality from heart disease. We can see how counties differ in their language based on how happy they are, or how healthy they are.

I've shifted to the county level. These are the topics, clusters of words that most correlate with well-being across the US counties (Figure 16). Two of them in red at the bottom are counties with low well-being. These are counties that are bored and tired. What are counties talking about with high well-being? “Personal training”, “meeting”, “conferences”, “suggestions”, “ideas”, “donating money”, counties talking about these are wealthier, but especially within the wealthy counties, the ones that talk more about “donating money”, “information”, “management”, “good jobs”, “building”, “compassion”, “caring about people”, “experiences”, and especially like going to the “ocean”, going to the “mountains”, going “camping” on the weekend. These are communities of Americans that have more well-being, and they are doing more outdoor things in nature. They are working with other people and donating more money.

Life Satisfaction across Counties



Figure 16

The other piece for the last topic is that well-being ties to health. The question is, can we actually measure something about language and health outcomes? Again, we'll take the Twitter language, then map it to a county, and correlate it with mortality from heart disease, dying from arteriosclerotic heart disease, hardening of the arteries (Figure 17&18²). We can see in counties with more heart disease, there's more hate and interpersonal tension. And there's more swearing, anger, hostility, more boredom, and tiredness. So, if your neighbors are being negative and swearing, you're more likely to die of heart disease. Lower heart disease on the positive side, people are talking about “conferences”, “customer”, “management” (skilled occupations).

² Eichstaedt JC, Schwartz HA, Kern ML et al (2015), Psychological Language on Twitter Predicts County-Level Heart Disease Mortality, *Psychological Science*, Vol.26(2), p163.

People are talking about “great food”, “friends”, and “fantastic weekend” (positive experiences), and they are also talking about “opportunities”, “overcoming” problems (optimism).

Associated with Lower Heart Disease

Associated with Higher Heart Disease



Figure 17



Figure 18

How does the language do well to predict heart disease? We can look at heart disease rates as reported on death certificates, and we can compare that to our predictions (Figure 20³). They are similar.

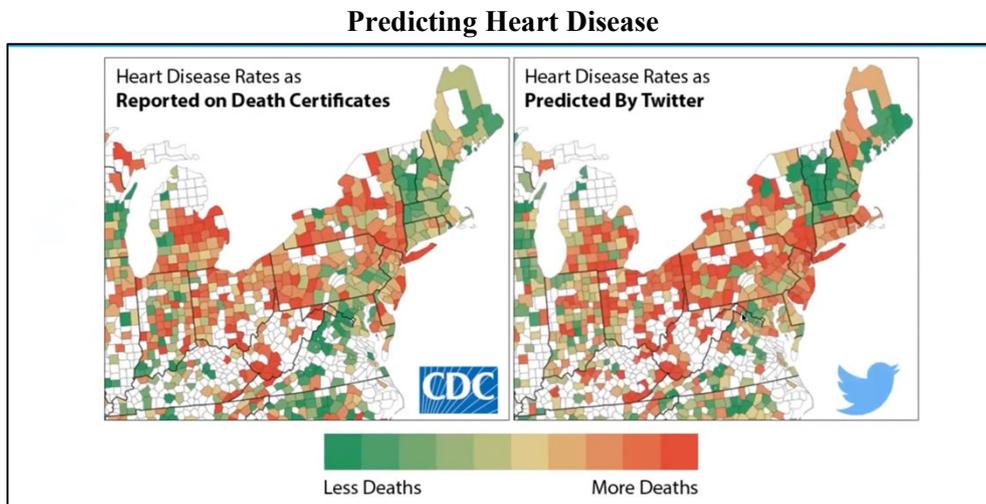


Figure 20

In Figure 21, we compare the predictions of AHD mortality from regression models with different independent variables. Predictive performance was slightly but significantly better for a model combining Twitter and the 10 traditional demographic, SES, and health predictors than for a model that included only the 10 traditional predictors⁴. What we can see is that males have more heart disease that predicts a bit. Smoking, diabetes, hypertension, obesity, all of them predicted dying of heart disease, which is not surprising. Twitter captures so much about the community that it knows not just education and income but lots of behaviors of the culture of the community. We get strong signal here. We use similar sorts of measures to look at things. For example, voting, where we find that, who is it that switches, which counties switched to vote for Trump, ones that were pessimistic about the future. In areas where people think that

³ Eichstaedt JC, Schwartz HA, Kern ML et al (2015), Psychological Language on Twitter Predicts County-Level Heart Disease Mortality, *Psychological Science*, Vol.26(2), p165.

⁴ Eichstaedt JC, Schwartz HA, Kern ML et al (2015), Psychological Language on Twitter Predicts County-Level Heart Disease Mortality, *Psychological Science*, Vol.26(2), p162-164.

the future looks bad, they vote to change the government, which is not surprising. Also, if they're poorer, but that's less predictive than pessimism about the future.

Predicting Heart Disease

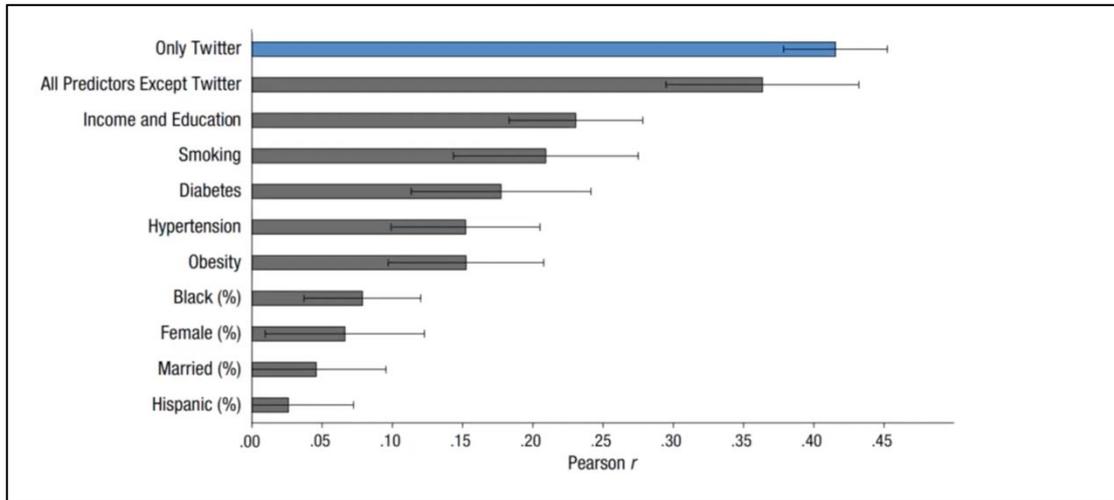


Figure 21

Also, I would like to talk about what else I'm working on for possible joint work in the future. The biggest thing I'm focusing on is to measure cultural variations across different cultures, and to try and understand how happiness is or isn't the same cross cultures. For example, Japanese people are on average less happy than Americans given that Japan is a wealthy and well-run stable government. You expect unhappiness in Africa or someplace with terrible problems, and Japan is a very successful country, a wealthy country, where people are less happy. Why is that? I don't know. Maybe because people put less importance on being happy and more importance on helping their family and helping their neighbors.

I was talking right before we started that Americans are twice as lonely as Japanese. America has a much more individualistic culture than Japan. We tend to do our own things and try to be happy, which is mostly not good. You should try to have good relationships and have meaning in life. Trying to be happy is the wrong way. But it's an interesting question. What do Japanese people value? Is depression the same? Do symptoms show up the same?

In America, people like to say, "I'm so good" or "I'm proud". And Americans hate saying "I'm ashamed of doing this". In Japan, I'm told by my collaborators, people don't like saying, "I'm so good." or "I'm proud of how smart I am". They do like saying, "I'm so ashamed" or "I didn't do a better job". It is very different of what's acceptable in the culture. In America, higher arousal and more excitement is good. We want to be positive, and we want to be excited and positive, but maybe calm is good. Being satisfied and content is good and being excited is less important than America. But I think to measure these things, which are minor technical details. Most people in Japan speak Japanese. Most people in China speak Mandarin. Most people in America speak English, although we speak lots of languages. That's uninteresting. More interesting is what do people care about. Are they caring about taking care of their parents, their children, or their co-workers? What is their value? And what is it they want? What does well-being mean to them? And then can we measure it in ways like using language? That's my biggest piece.

The other piece is ChatGPT. In America, everybody just talks about ChatGPT, or these models. ChatGPT is a new product, which has in the last month a million new users. You can type any question. For example, I typed right before this meeting, "please translate the following into

Japanese”. And you can see the translation. The question is, how might I use ChatGPT to increase well-being?

Comment and Q&A

Prof. Masaya Kobayashi

My present question is two points. You very clearly explained your main works between positive psychology and social media inquiry or text analysis. The point is that, obviously, positive psychology or such kind of psychological investigation have clarified various points to the world, but I wonder what is the new point which Twitter analysis or social media analysis, takes analysis clarified the point, which was not found by questionnaires? Some of your present talk like empathy is very fresh to me. I suppose such kind of arguments or new findings are being already done by your team and such kind of investigation. That's the first question.

Second, I am very interested in your research on county level or community level because county/community is quite related to social or political dimension. Also, I have known that your team has already done great work on the election through social media language and inquiry. That's one of my priorities of our research team because I have already made some progress in making research on the relation between Japanese election and positive psychology. Could you somehow briefly introduce your findings to Japanese audience because it will facilitate our project team. I hope that we can collaborate with you on this point.

Also, I would like to hear from your frontiers research on cultural variation. I am very happy if you could explain what the present stage of international collaboration and cultural variation is.

Prof. Lyle Ungar

The first question, what do we get from social media that we don't get from questionnaires? I think there are two answers. One is for a questionnaire. You need to know what to ask. If you know what to ask, you get a good answer. If you don't, then you don't. For example, when I looked at well-adjusted Americans, I was surprised to see how much people talked about sports. Now, I know that sports is very important in many cultures. I know because I see that Japan shows up in the sports news here, too. But I hadn't thought of, and people had not thought of sports as being part of well-being. People think about exercise as being part of well-being, but they don't think much about sports. That for me was an interesting hypothesis generation. And it's common in the marketing world to have focus groups. You pulled together 20 people, you paid them to ask questions, for example, how do you feel about something? A car, a product, a politician. In some sense, what I get on Twitter or Facebook, a very large focus group. It's not a random sample of people. But it's a bunch of people. What do they say? What do they say about this? What are the comments about this? If you want to know what people think about GE or Biden, then Twitter is not a representative sample. But it's very cheap, very fast changing. What are the reactions to this? For example, we're seeing a lot of press now in France because they're trying to raise the retirement age. Lots of protests there. Macron is worried because there's a lot of contests there. He thinks he has the right solution that people are getting older, they should work longer. Other people are burning stuff in the streets. Can we do a very quick understanding of what people are arguing about in France by monitoring what they're saying? Does that make sense? It's so much more expensive to send pollsters out and ask questions. And it's not even clear what the questions are that you should ask. Why are these people? From my perspective, I didn't understand it until I talked more to French people. Americans don't feel so negative about working longer. We'd all like to retire early, not me. I like working. But there's something different about friends. There's a belief in welfare state. I think one thing is to get answers quickly to questions you didn't think to answer.

The other piece is that polling is very expensive. And in the US, you can get detailed polls at the state level. But the counties are expensive. It's hard to have details. Not surprisingly, we often don't know the outcome of an election until after they count the votes. I always think this is crazy. We're spending tens of millions of dollars on polls. And we don't even know what President the county will vote for, let alone more detailed questions are what people care about, what they're happy or not about. It's much cheaper to measure Twitter. We can't get tiny counties, but for 2000 counties, we can get enough tweets to at least see if people are talking more about this or less about this. What you get is an ability that's much finer grained. It's not the same quality as a Gallup poll. I love the Gallup polls. They're very good. I love the US Census. They're very good. We have a very good Census Department. But it's too expensive to ask everybody every question. And even things that I think are incredibly important. How lonely are American? No one has done a good poll across America to measure loneliness. People, insurance companies, health companies have asked small sample, 100,000 people, but not enough to have a representative sample, and not to know how much for sure as it's varying. Not to know the age effects, lonely people. The loneliest people are mostly people 18 to 25, which is somewhat surprising, or people over 80 who can't leave their house. Can we get the details? How is that changing? So, note that there are lots of things you wish you could do a poll on, but it's expensive. And if you want resolution, how is it different in the cities versus the countryside? Many countries, I don't know about Japan, but I know about China and the US, the cities and the countryside are different worlds. There are different incomes, different concerns, and different social relations.

We need to have measurements that kick these things into account to just group a whole prefecture together with the city and the surrounding countryside. Again, I wish I could do polls, but they're too expensive.

Second question about county level politics. I think the question we've asked mostly is, what causes people to try and vote out the incumbent? In general, if you're in power, you stay in power unless somebody is unhappy about you. And now the question is more precisely, what forms of unhappiness do people have? What do people care about? The classic economic argument is people care about how much money they have. And if the job market is bad, and they can't find a job, then they vote for change. And if the job market is good, and they have a job, and they're making money, they stay. This is not a bad approximation. There's been better studies in Europe than America, because Europe is a whole bunch of countries, you get more data. You can look across countries, lots of elections. This is true. The economists are right. But it's a little more subtle. And what we see in America, and I think we will see also in Europe, is what really matters is how optimistic people are about the future. In America now, things are very strange. People are mostly thinking they are doing okay, job is fine, but the country is going the wrong direction. We're going to fall apart. There's too much descent. For example, the economy's unstable, and AI, or China's going steal our jobs. Mostly people worry about China. They should be worrying about AI, but they're still insecure. And note that even though they're currently having a good job, unemployment is very low right now in America. But people are worried. And when they're worried about the future, they vote for change. So, note that this is now a psychological change that says that people in economics did the first pass, which was measured dollars, or Yen, or RMB. But that's not the bottom line that makes the metaphor. What people really care about is not just the money, but how well things will be doing. And now we have a more psychological basis, which ties to money about the future. And that I think is interesting. And there're lots of room across different countries to measure, what are the real psychological factors that drive elections. And the way that we looked at mostly is, who votes for incumbents, who changes their vote, who used to vote for one party

but now votes for the other one. America had a very big shift when Trump was elected. Many people were unhappy about the way America was going. And they voted for radical crazy change. Some of them wanted to vote for Bernie Sanders, a socialist with radical change. But the majority went to Donald Trump, which was also a radical change. Maybe too radical. Many of us didn't like it. But I have a more optimistic feeling about America. And many people don't love Biden, but if you think, "Oh, things are going okay, keep the guy. He's okay." That's a psychological story and one that I think needs lots of work over the coming years to say, what are these big psychological components that vote and drive voting, and how can we measure them?

Finally, about cultural variation. For the Japan side, Jeanne Tsai at Stanford, a cultural psychologist, who has collaborated as she started in China, but now also in Japan, has done a number of studies on "ideal affect". She's a close collaborator and has collected lots of tweets. And her theory is that in America, people want positive, high energy, excitement, high valence, high arousal. If you violate that by being negative, you get more press. And in Japan, people want positive, lower arousal, you want to be calm and positive. If you violate that by being more excited, you get more retweets. She calls that "ideal affect". These are how the culture wants to be perceived. She's now collecting not just general tweets in Japan but also comments on news articles. What comments on news articles in Japan get more attention? Her hypothesis, which we haven't tested is, if it's more excited and positive, it'll get more attention, and if it's called, whereas, in America, being negative, will get more attention. It's a question of what draws attention. And in some sense, if you violate the cultural norms, do something different, then that draws attention.

And I am trying to look at questions like less political shame. In America, talking about shame violates the norms. In Japan, you may feel bad being ashamed, but you're much happier to talk about it. And this to me is interesting in terms of what one wants to be and how you talk. If you do surveys, you can see Japanese say they are less conscientious than Americans say we are. This is ridiculous. You started the meeting exactly at the top of the hour. If this were America, would have been 3 to 5 minutes late. If you look at behavioral measures, Japanese are very conscientious because people show up on time and they do what they're saying to do. America is rather more relaxed. Brazil, Mexico is way more relaxed. But the surveys don't confirm that. What's happening? I think when you ask a Japanese person, "are you conscientious?" He looks around friends and coworkers and say, "well, not as much as he is, he's much better. Plus, I should be modest. It's not good to say how conscientious I am". If you look at Americans, we look at other Americans and say, "Ah, yeah, compared to him, I'm only 5 minutes late. I only missed one meeting last week. I'm very conscientious. Plus, I'm in America, and it's good to see how good I am." So, note that having behavioral measures often gives you something that you don't get from surveys. And my final point, language is more of a behavioral measure than a survey. My hope is that you may actually see some language what people are doing, not just how they think they should answer the questionnaire.

Prof. Masaya Kobayashi

From my point of view, your research on the macro level is very beneficial for Japanese, not only researchers, but policymakers and governments for considering what to do in terms of well-being. Is there any example those public institutions have already used your kind of analysis? Also, I have already read your articles on the Trump election. I wonder if there is any development after election.

Prof. Lyle Ungar

Let me answer them in reverse order. No on the Trump, but there have been nice studies in Europe, by my collaborators. In terms of government agencies using it, in the US, only the state of Washington was very interested during COVID and trying to monitor the well-being and how it changed. COVID had a huge negative effect on the population. The question is, can we measure the psychological well-being of the people in the state? And what are their concerns with respect to COVID? What are they worrying about? We've also been talking to the Census Department of Mexico. They're not using it yet, but they're very interested. Mexico has way less money for doing census measurements than America does. It's not as wealthier country as US or Japan, obviously. And their question is if they can do some of the measurements that they wished they could afford to do. If they were America or Japan, they would do more surveys, but they're not as wealthy. They're trying to use Twitter. They've used it for some things to track tourism flow during COVID. As you can see, by looking where the English language tweets are travelling, where tourists are, so it's way of monitoring tourism, which as you would have guessed, has had a big hit during COVID. And it's a much bigger part of the economy there. But that's the sort of piece where they're moving toward is if they can find big signals, for example, tourist location, or big shifts in well-being due to exogenous shocks like COVID.

Prof. Hikari Ishido

I was thinking what the cultural difference between US and Japan in terms of could be responding to this question of whether you are happy or you think yourself as a conscientious person. My way of thinking is that US society is kind of like an open loop thinking society. You can just speak out what you think directly, because when you have a negative repercussion, you always have this new frontier, new cities of escape and everything. But here in Japan as an island and high-density population country, we really don't have escape cities to go to. We have to anticipate this envious repercussion, negative kind of repercussion. So, in anticipation of these negative feedbacks or repercussions, our initial response is already cautious or understated. Technically speaking, are there any sort of statistical information technology technique dissecting between initial, I mean, direct speaking up component and preventive, or cautious repercussion, or anticipating type of understatement? Basically, causality can be unidirectional. But in the case of this closed loop, "what you're thinking", the causality could be bi-directional, "what I'm talking". So, when I say, "Okay, I'm a conscientious person", then I would already anticipate a negative or envious repercussion from this high population density community. I will say, "No, I'm not conscientious as my colleague". It's understatement. Although I might say, "Okay, I started this session on time", and I woke up. Any statistical or IT technology which can dissect these two impacts?

Prof. Lyle Ungar

Let me start with a little background, which we're looking at. The cultural psychologists distinguished individualistic societies and collectivist. The name that they'd apply to exactly your story is that Japan is much more collectivist. And collectivist society on the one hand, you take care of your family and your parents and your neighbors, and the other piece, you're also stuck with the same people forever. This is your small island. In America, if you don't like someone, just go away. We don't believe in having enemies like some countries do. Either you're my friend, or I don't talk to you. We have this sort of non-attachment for better or for worse. In a collectivist society, it's your mother, what do you mean, you're not going to talk to her? It's your responsibility as a son to take care of her. This connection that is always there, and because of this inescapable connection, relationship management is central, more important than anything else. That's the first piece. Now the question of, is there IT ways to do this? I

don't know. Let me shift now to China, which I've looked at more, which is also a collectivist society compared to the US. What Chinese people say is that understanding what said in any given statement in Chinese is much harder than English. In the individualistic English language, each sentence is self-contained. It's a low context language and a low context culture. When you say something in America which is a country of immigrants, you need to be able to talk to someone. If you look at my research team, there are German, Chinese, and Surinamese. They all speak different languages. That's a very international group. It's very important in that culture that American culture to be very clear and direct. A collectivist culture life is high context. When you talk to someone, you know something or if not, you want to have dinner, you want to meet their parents, you want to meet their. It's knowing the background and so when you say a given statement in a high context culture, the information is not in the statement. You need to know who you're talking to, you need to know the background. This is the psychology story. Now the question, which I have not yet done is, we should be able to actually show this with our computer models. I haven't done this. It should be case that many Americans statements, computer reads the statement, and the meaning is clear.

In a Chinese statement, and I think Japan will be very similar, Japan as a collectivist, high context culture, to understand the statement, will require knowing more context. That means that in some sense that things like ChatGPT, which is a low context American product. It doesn't know who you are. It doesn't know what your relationship. It doesn't know what you care about. It doesn't know who're your parents. All it knows is the statement you put in. It's a very low context. There should be computable measures of how well I can estimate anything about someone but their intent, concern, feeling, and beliefs, should be harder in Japanese than it is in English, if you believe that theory. So, that's my hypothesis, but I have not tested it yet, which we should.

Mr. Alfonso Torrero

I was thinking about some practical applications of your research for having a fairer society. I thought that identifying words and sentences related to personality traits such as neuroticism, depression, could be useful to show specific health apps in people's social media. Instead of that we are used to get ads from products and services that we search for, but maybe related to this group, it could be very useful to relate the words the sentences that you have found to show people some psychiatric help, or maybe specific social groups. That's what I thought.

Prof. Lyle Ungar

I would love to have the ability to both provide people, not psychiatric care, which is too complicated to do by chatbot but at least help and advice to make this available. Most people have cell phones now. We can give them access to lots of information in a way that's more chat based. The other piece I would love is, as you say, not to sell people products, which they mostly don't need, but to have something that's much more of a targeted. For example, "Wouldn't you like to go for a walk now?" I see based on your schedule, that you have a half hour until your next meeting. Or last time that you had lunch, you enjoyed it with this person. Why do you haven't put lunch on your calendar for a while. Why don't you call this person up? I'd love to see ads, or chats, or cheap communications that encourage healthy behaviors. But for me, I'm much less interested in telling people not to smoke. They all know smoking is bad for you. But to help them to remind themselves of, here's how to take the time to go for a walk, there is the time to talk to your friend. Here's compliment someone. When you're in the shop, say something nice to the shopkeeper. There are million things you could sell people that are free behaviors that do not cost money but make people more satisfied and happier with their

lives. And we don't have a good infrastructure. I think the fact that everyone pretty much has cell phones now means that if we can figure out how to target these in a way that's useful, rather than annoying, where people opt in and say, "Yes, this is what I want to do. This is my goal." They say I wanted.

I'm hoping we can help build chatbots that target them at the time they want, in the language they want, with the frequency they want, gives them helpful reminders that they want. I think the cost of these things coming down is great. And the benefits should not go only to Google, Amazon, Facebook, or TikTok, which mostly does do not make people happier. It should go to actually increasing well-being. And if the cost comes low enough, it means that you could almost have a personal trainer, which is a wealthy person luxury, available for free on your phone, which should be something affordable to everybody to help them be motivated to exercise. My fantasy is that we really have very cheap interventions that people can say, "This is my goal. I want to walk twice a week half hour", and the app helps them do it. That's our next big mission is to start building these apps and testing them.

Dr. Xiaofang Zhang

I am Chinese, but now I live and work in Japan. You said that your team also analyzed Chinese well-being. About Chinese well-being, I have two questions for you. First, as a Chinese, I'm very interested in which social media your team used to analyze Chinese well-being, because as you know, Chinese does not use Facebook, Twitter, or Instagram, that kind of the international social media much. So, which social media does your team focus on in China? This is my first question. My second question is, in the well-being analysis about Chinese people, which result impress you?

Prof. Lyle Ungar

I would like to use WeChat. But the security is much too tight. Facebook is very easy to get, and everybody can share things. WeChat has very good security. Even if people want to share their WeChat with me, it's not easy for them to do that. But Weibo is easy for people to do. And we use the same sort of techniques in China we do in America. That is there lots of market research firms. And what market research firms do is they pay people to take questionnaires and to share their posts. The same thing that people use who are trying to understand products, the Chinese markets use, we use to understand to try and measure well-being. That part is relatively easy, and it's controlled. It's tricky that you can't ask questions about political government which I'm not interested in. And there are some tricks that make it easier because China is very happy with Hong Kong being ambiguous. Hong Kong is part of China which also tends to support many of the American companies like Amazon Web Services. And so, we can run servers in Hong Kong that are both in China. And so, we're allowed to check Weibo and are accessible to the American infrastructure. You don't have to have as many Chinese accounts. That was relatively easy when it's always problems with data sharing.

What have I found? Not much yet. We're just starting. We started looking at not well-being but individualism versus collectivism. And everybody talks about America versus China. America is individualistic and China is collectivist. China's a very big country. And there are substantial differences between the regions that were historically wheat growing Northern and the Southern that are historically rice growing. This is also true within Japan. We replicated these findings in Japan.

You can look at different regions where 50 or 100 years were mostly wheat and mostly rice, both in China and in Japan, then collect Weibo in China, Twitter in Japan, and we now look at the language, look at how people are talking. And there are substantial differences. And you

get in the collectivist region's much more small community. In the individualist, both things I would have thought more consumer goods buying, and we're talking about Beijing, and things that are international. My first thought was, why is that? But collectivist is your local community. In China, that's not a collectivist view. Collectivist, it is your community, whereas the more individualistic parts of China are more engaged with the nation.

The other piece we're starting to look at is urban rural. There's a huge difference and starting to see what some of the concerns of people are in urban versus rural regions. And most of them, I think, are obvious to anybody in China. But I haven't realized as an American, how challenging it is in the large city to find an apartment for your parents that you need to take care of them, and real estate is very expensive. And it's a trivial finding.

But I think in terms of these questions of where this is going, I think that if you think about governments and people concerned about community, trying to see what people are worrying about, this is something where one could do a more detailed analysis of how much is the Shanghai versus Beijing versus the smaller cities. What are the different concerns? We have not looked in detail there, but I think that's sort of the direction is to try and understand more about what do people in different groups. We're also trying to understand stress. What are people stressed about? Emotionally, it's the obvious. China's a very exam-oriented country, not to say that Japan and the US are not also exam-oriented. But we see a lot more concern about exams and a lot more concern about rapidly changing, rapidly growing wealthy country. I miss the rise there. The answer is now I don't have anything good to report. But we're still in the first stages of setting up the infrastructure to do some surveys to quality control it because lots of people just do the surveys for money and don't really answer honestly. And to then collect Weibo and do some more analysis to very early results.

Assoc. Prof. Xiang Li

I did some text mining before. I really feel your research is very useful and has very bright future application. I'm just wondering, the knowledge you mentioned can be applied to the human behavior prediction. For example, you talk about the emotions, and five big emotions characteristics. Maybe that kind of knowledge can be used or applied in human decision and prediction. For example, how people decide to shop, how people decide to make certain behavior. I'm just wondering if that is also possible to do that.

Prof. Lyle Ungar

People have done some targeted advertising. If you're an extrovert, show an ad with you, and 10 people playing together, show it as something with a big crowd. If you're an introvert, sell someone a game that you play by yourself, something you can do by yourself. There is some work there. Mostly, personality is not so useful for predicting marketing as what you have bought in the past. The big companies mostly use what you clicked on, what you have bought in the past, better than most of the language. People have tried in Britain. They tried selling car insurance. If you have a conscientious personality from your Facebook, we'll give you a discount, because we think you drive better. But that only lasted a few days because people thought that was very intrusive and violating privacy, even though people volunteered to share their Facebook. I think one thing to realize is there's big cultural differences in terms of how comfortable people are in sharing.

I think in America, people are much more willing to share their social media. In Britain and Germany, people are more private. They think that it's not right for a company to access their social media. I think there's a big question here of consent. I think there are big differences across cultures, in terms of how happy people are to have their information being used. I also

think that if people know their information is being used to help them, they might be more positive. But it's still unclear to me when these things are used, meant where they're helpful. I've also thought less about selling things. I'm a positive psychologist. I want people to have meaning in their life and good relationships. I'm less interested in selling them stuff. But I think many of the same methods are used. I think the open question is, for predicting behavior often measuring behavior is the best prediction? What are people buying? Where are they going? Who are they talking to? I think one wants to have not just language but actual behavioral measures. And what I see companies doing more and more is using actual behaviors, what they know from your phone, what they know from your shopping, and less of the language. But it's had some signal.

Prof. Masaya Kobayashi

I wonder whether there is any influence of recent change of management on social media such as Twitter or Facebook. Do you think there is any impact or influence on your research?

Prof. Lyle Ungar

Facebook, no and Twitter, yes. It was free to get 1% of all the tweets in the world. For decade, we collected 1% of all the Twitter, and sometimes more, which is very cheap. Now, it's become tremendously expensive. Twitter is now charging \$10,000 per month. Currently, there is no academic discount. That's now \$100,000 US a year, which is a lot of money to spend to collect data. It's really going to make a huge difference. I think if this happens, it's going to be very hard to do well-being research or political science research because the cost is just prohibitive. If you're a company like Microsoft, 100,000 a year is nothing. But for academic, this is a large budget. I think it's unclear how that's going to go. I think we're thinking about changing to have more people be willing to let us to text messages and communicate by text message. I think it's an open question.

We look at Reddit, where people post things. Twitter is really global and everywhere in the world uses Twitter. I think there's a big open question now of how we can cost effectively collect data. And maybe, it's going to shift away from monitoring Twitter, toward measuring comments and news sites, which we can grab in the US and Japan, where people have comment pages where they do things, but that's a very odd set of people. Most people in the world don't actually bother to read news articles and comment on them. Maybe, it's something that involves much more open-ended polling. One thing we've looked at is asking people just questions. For example, "How do you feel about the economy?" And just take the text, and we can process that, which is alternative from asking a fixed polling question because I want open-ended questions.

It's a period of uncertainty, but I think that Twitter may change their mind and decide that they care about supporting well-being. Or they may decide that they just want to make money, and they don't care about helping. It doesn't cost them a lot to give us the tweets. And in some sense, it benefits them because we then publish methodology companies can use. But clearly Elon Musk's current concern is not sponsoring academics, but how to make money tomorrow. And it's going to be a big problem for that measurement. I think we are looking for other ways to collect data.

Prof. Masaya Kobayashi

I wonder whether there are any differences of analytical predictivity between using Twitter or using Facebook. Is there any difference in the field?

Prof. Lyle Ungar

The methodology is very much the same. The topics covered are different. We've found surprisingly that we do roughly as well as estimating depression from people's Twitter or from their Facebook. We have people where we've collected both from them and then measures, closer than I would have thought. Surprisingly, there's a fair amount of political discussion on both Twitter and Facebook. Amazing number of Americans get their news on Facebook. We used to measure influence by looking at what newspapers were read in a given community. Americans don't read newspapers anymore mostly. Everything is online. It's Facebook, YouTube, or Tik Tok. And so, it's harder to measure it. But all these media have lots of pieces. One thing we're thinking about TikTok, at least in America is enormous. And TikTok is providing APIs to download TikTok. It's much more expensive to process because this is audio visual rather than text. Twitter is cheap. I can afford to process them on a university computer that I own, or university owns. For TikTok, I'm going to need more compute power. But I think that's the way things are going is more of this multimedia piece there. And people are commenting and watching TikTok. It's measuring something. I think that's the next question is, how we do process in these other pieces where it's much less obvious.