



UNIVERSITY OF NEBRASKA-LINCOLN

Kimberly Tyler, a sociology professor at the University of Nebraska-Lincoln, is developing an app-based just-in-time intervention that can provide supportive messages at critical times when youths experiencing homelessness may be tempted to use drugs or alcohol as a coping mechanism.

App could offer supportive messages to at-risk youths

UNL professor has received \$3.4 million grant to develop the intervention

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While there are downsides to cellphones, the devices for many people have become an important way to connect with friends and family members and to reach out for help during times of trouble.

Kimberly Tyler, a sociology professor at the University of Nebraska-Lincoln, aims to capitalize on those technology-facilitated ties by developing a data-driven, app-based just-in-time intervention that can provide individualized, supportive messages at critical times when youths experiencing homelessness may be tempted to use drugs or alcohol as a coping mechanism.

Tyler last year received a five-year, \$3.4 million grant from the National Institute on Drug Abuse, part of the National Institutes of Health, to develop the intervention. The real goal is to mitigate substance misuse, which is two to three times more prevalent among youths experiencing homelessness than among young people with a regular place to stay.

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App

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The idea for the current project, Tyler said, grew out of an NIH-funded pilot project in 2017. At that time, she and her team were using the less-sophisticated cellphones of the day, which they issued to the youths on loan, to collect daily data on alcohol and drug use among youths experiencing homelessness. They programmed an automated system to send them questions.

Using the phones to collect data made sense, she said, because the youths move around a lot and can be hard to reach. At that time, however, no other researchers had used cellphones to collect data with that population. The UNL group's particular aim was to determine what types of things, known as protective factors, might keep youths from misusing substances.

At the end of that project, the researchers asked the youths what they liked and didn't like about the study. They learned that the cell-

phones served as a lifeline for the youths, many of whom didn't have the devices at the time, Tyler said.

Some were able to get jobs because they could provide a callback number for employers. The phones also provided social support by connecting youths with family and friends — and with the researchers themselves. The team members checked in with the youths every few days, asked how they were doing. By doing so, they served as supportive adults with whom the youths could talk and process their problems.

"One of the biggest takeaways from that project was that the cellphone itself acted as an intervention for the youth," she said.

She also realized that the youths needed the kind of supportive messaging that team members provided, and coined the term just-in-time personal support intervention.

The idea was that youths experiencing homelessness may be more likely to misuse substances at certain times, such as after sexual or physical victimization, during

times of poor mental health or while socializing with risky networks. Through the use of mathematical modeling and machine learning, the app would be able to identify how likely individual youths were to use substances at a particular moment and deliver supportive messages to redirect them. In addition, the app could send information about services available in the area.

Tyler said it took several years to get the new grant funded. But the researchers kept applying. Tyler knew that many youths — about a third by her estimate, although she acknowledged the number varies by city — never go to shelters or agencies where they can get counseling and other services.

The researchers now are in the first phase of the project, collecting data from 150 youths, ages 17 to 24, who don't have a permanent residence in Omaha, Lincoln and Kansas City. They are conducting surveys and collecting other data over 60 days through a software platform called the Open Dynamic

Interaction Network, developed by project co-investigator Bilal Khan, who is now at Lehigh University in Pennsylvania.

Then they'll build models based on the data they collect and use machine learning techniques to generate at least 150 user profiles. A new user would take an initial survey that would classify them into one of the profiles, which will allow the app to predict a youth's coping patterns and provide tailored messaging.

"We have a pretty good idea how they're going to respond to stressful situations based on past behavior," Tyler said.

The team will refine that messaging during a second phase of the project by conducting focus groups with youths in each city, she said. That might include asking what kind of messages would be helpful — and what would not — in particular situations, like having a backpack stolen. They'll further refine them by meeting with staff at agencies that work with the youths in the three cities.

At that point, they'll add services offered by the agencies, from pizza parties to job opportunities. The app will be equipped with GPS. When youths using the app get within a certain distance of a service, a message will pop up on their phones alerting them and providing details about the location and time it will be available. Youths experiencing homelessness often miss out on such opportunities because they don't know about them.

In a third phase, the team will roll out the app to a new group of 150 youths in order to assess its functions and users' reactions.

Ideally, Tyler said, the team would share the app with agencies across the U.S., customizing it to different locations.

"I knew it was just a great idea, and I knew this could have an impact," she said. "I'm so glad the reviewers finally funded it last summer."

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