# New Methods for Smoking Research

#### with Megan Piper, Lisa Dierker, and Stephanie Lanza



**August 28, 2012**

Host Aaron Wagner interviews three researchers, [Megan Piper](http://methodology.psu.edu/people/mpiper) of the University of Wisconsin’s Center for Tobacco Research and Intervention, [Lisa Dierker](http://methodology.psu.edu/people/ldierker) of Wesleyan University, and [Stephanie Lanza](http://methodology.psu.edu/people/slanza) of the Methodology Center. They discuss [time-varying effect models](http://methodology.psu.edu/downloads/tvem), the potential for ecological momentary assessment data to advance smoking research, and an upcoming the [special issue of Nicotine and Tobacco Research](http://methodology.psu.edu/news/call_for_papers_ntr) that will focus on new methods for smoking research

**Podcast Timeline:**

00:00 - introduction

01:30 - Megan Piper: EMA data allows understanding of how quitting smoking works

05:40 - Lisa Dierker: TVEM lets us answer new questions about how people develop smoking behavior

09:12 - Stephanie Lanza: Advancing the methodology of smoking research

13:50 - Stephanie Lanza: Upcoming special issue of Nicotine and Tobacco Research

Speaker 1: Methodology Minutes is brought to you by the Methodology Center at Penn State. Your source for cutting research methodology in the social, behavioral and health sciences.

Aaron: Welcome to Methodology Minutes. Our podcast today looks at how innovative methodology is changing the field of tobacco dependence research. Some of our recordings came from the March 2012 Society for Research on nicotine and tobacco's 18th annual meeting in Houston, Texas. There I spoke to Megan Piper of the University of Wisconsin's Center for Tobacco Research and Intervention about a pre-conference workshop that she has organized with Stephanie Lanza of the Methodology Center. We talked about the workshop, new methods for advancing research on tobacco dependence, and about why smoking researchers need methods to analyze data from hand held computers and smart phones.

Then I spoke with another prominent smoking researcher at the workshop, Lisa Dierker, of Wesleyan University. Lisa researches early smoking behavior. We spoke about her research and how it intersects with the methods discussed at the workshop. Specifically time varying effect models. These recordings were made in the middle of a conference, and we apologize for any background noise.

After the success of the workshop, the decision was made to go ahead with a special issue of the Society For Research On Nicotine And Tobacco's journal, Nicotine and Tobacco Research. So workshop organizers, Stephanie Lanza and Megan Piper, and keynote speaker, Saul Shiffman of the University of Pittsburgh, have agreed to edit the special issue. At the time this podcast was recorded, they were seeking proposals for articles for the special issue. I spoke to Stephanie abut new research methods and the upcoming issue.

With me now is Megan Piper, Assistant Professor at the Center for Tobacco Research and Intervention at the University of Wisconsin. Megan, thank you for sitting down with me.

Megan Piper: Oh, thank you.

Aaron: Can you tell me a little bit about your background, and why did you decide this workshop was needed?

Megan Piper: Sure. A lot of my research focuses on helping people quit smoking, so I focus on cessation treatments, but I also focus on understanding how the different treatments work and for whom they work. It's not just enough to know that one medicine works better than another, or one counseling approach, but we need to understand why. If we can understand why, we can build better treatments. We can combine treatments together in a better way. We can work on developing new treatments for particular people for whom current treatments don't work. There's a lot about the mechanisms and the underpinnings of these different treatments that we need to understand. In order to do that, you really have to drill down. To do that you need to be able to analyze the data once you look at how people are responding to treatment.

After meeting Stephanie and working with people at the Methodology Center and seeing all of the innovations that they can bring that allow me to think about treatment effects in new ways, this gave both Stephanie and I reason to think that perhaps a whole field would benefit from understanding new methodologies that we could then use to sort of broaden our ability to ask questions about how treatments work.

Aaron: What new methods have you been incorporating in your work?

Megan Piper: One of the biggest new methods that Stephanie and I have been working on together with other people from the Methodology Center and from our center as well, are looking at time varying effects models. We want to understand, sure we know that baseline tobacco dependence means that you're more likely to relapse when you try to quit. We know that if we give you a combination nicotine replacement therapy, you're actually more likely to quit than if we just give you a mono-therapy, a single, like the patch or the gum.

How do these effects change over time? Does it matter if we give you this treatment in the first week? Does it really play a role in the second week? When is it that tobacco dependence is really key? When are we seeing changes in craving that are related to treatment? This is a brand new area for me. I think the Methodology folks have been thinking about how the effects of a certain variable can change over time, but in terms of my understanding about treatment effects, this is the first time I've really thought about you could actually quantify the fact that an effect is different throughout some ones quitting, which makes a lot of sense. It could be that the first couple days you're really relying on your medicine, and then after that it's not so bad. When you have a really bad craving, you really need to be able to have your lozenge for you. It's enabling us to examine treatment effects, like I said, in a new way that's really exciting.

Aaron: One of the themes that's running through the workshop today is EMA data, which is necessary for the time frame effect model, which is also necessary for the other methods that are being discussed today. Why is EMA data the theme? Why is that type of data so important?

Megan Piper: The Ecological Momentary Assessment data, which actually, Saul Shiffman in the workshop did a fabulous job of explaining, is all through those things. Ecological meaning it's out in the world. We know a lot about what happens to people in the lab, but we have very limited amount of understanding of what happens to smokers out in the world when they're exposed to other smokers. When they're exposed to cues to smoke or when they're in places where they're not allowed to smoke.

Momentary meaning we can collect lots of data. We can look at how things change over time. People's cravings are not constant throughout the day. They come up, they go down, the same with their mood, the same with their stress levels. If we can assess people in their real world at lots of different time points to understand better how their smoking motivation changes over time and changes based on their context, their real world context, then we can really get at what it is that treatment is doing to help people quit.

Aaron: I didn't mention this in the introduction, but its lunch here during the workshop, and Megan and I both have to get back and eat lunch. I'm going to say thank you very much for taking a minute to talk to us.

Megan Piper: Oh, thank you.

Aaron: Sitting down with me now is Lisa Dierker, Professor of Psychology at Wesleyan University. Lisa, thank you for taking the time to talk to us.

Lisa Dierker: Thank you.

Aaron: How did you get involved in this workshop?

Lisa Dierker: I spent a year, three years ago, at the Methodology Center. I'm a Substantive Smoking Researcher, so I'm interested in asking questions about the development of smoking behavior in children. I was invited by Linda Collins to work with people at the Methodology Center to think about how substantive questions can marry well with methods.

Aaron: How did you come to be presenting today at the workshop?

Lisa Dierker: I was invited by Stephanie Lanza. I continue to collaborate with Runze Li around his time bearing effects work. I've been thinking of ways that time bearing effects can better answer questions related to the development of smoking behavior.

Aaron: How does the time bearing effect model fit in with your research?

Lisa Dierker: You know, it really allows us to ask and answer questions in new ways. Traditionally with smoking research, we take either a very proximal view, where we're looking very closely at sort of minute to minute behaviors like cravings and urges and things like that, or we sort of pan out and look at the development of smoking from a very distal perspective. Thinking about how parents smoking over the years might put someone at risk for smoking, or even prenatal exposure to smoking. Things like that. I really feel what the time varying effects models do is help us sort of even modulate those views of behavior and both look closely but look at some more sort of proximal issues like quantity of smoking and nicotine dependence symptoms and how those are developing, but look at it across a wide enough range of time that we can get a new view of the behavior.

Aaron: Over the long term, what sort of results do you hope that that would yield?

Lisa Dierker: Most of the intervention prevention programs available for smoking either try to help kids before they start smoking or once chronic smoking has been developed, we've got many effective treatments for smoking behavior that help with cessation.

What we don't have are interventions that get at youth and young adults before the development of chronic behavior, but after initiation of smoking. There are, I think, real opportunities for more targeted prevention that could be cost-effective, really addressing the kids at highest risk, but also getting to them before those pack a day behaviors begin to develop.

Aaron: One of the themes of this workshop has been the use of ecological momentary assessment data. Why is that data so critical for answering those questions, do you think?

Lisa Dierker: I think it really lets us, first of all, look at the behavior more closely, more in sort of the moment to moment experiences that youth are having with smoking behavior and with their sort of day to day feelings about it. The other thing I think that is very exciting is thinking both about that sort of close view of cravings and urges and quantity and frequency and those sorts of things, but also stringing those close views together across time. Being able to look at how those proximal risk factors work and how those proximal risk factors may actually change and function differently as the behavior develops and across stages of smoking. Aside from looking closely, if we string together those close views, I think we can really get a new look at smoking behavior, and hopefully understand it in a better way.

Aaron: Well, Lisa, thank you very, very much for your time. Like the other presenters, Lisa's presentation will be available of the Methodology Center website. Lisa, thank you.

Lisa Dierker: Thank you.

Aaron: We're back at the Methodology Center now and I'm sitting down with the Methodology Center's scientific director, Stephanie Lanza. Stephanie, thank you for joining us.

Stephanie Lanza: Thanks for having me, Aaron.

Aaron: I asked Megan this same question. Why did you think this workshop was needed?

Stephanie Lanza: It was important to have this particular workshop at this time, because the research on tobacco use is advancing so rapidly. The recent adoption of data collection using EMA methods, most frequently using smart phones, allows us to examine constructs like smoking behavior, withdrawal symptoms and relapse really intensively over a period of time, in the context of whatever's happening in the lives of the participants.

At the same time, here at the Methodology Center we've been developing new methods that allow us to make sense of this wealth of information that's embedded in the EMA studies. I think together we've come to a critical point in research where we want to bring together the data that's being collected by tobacco researchers, and these advances in methodological techniques, so that we can move the field forward.

Aaron: Now that the workshop is over, how do you feel about it?

Stephanie Lanza: Well, we were extremely excited with the workshop at the time. The fact that the room was packed with more than 80 tobacco researchers, it was a surprise and a pleasure. We couldn't have pulled it off, I need to say, without the strong support of both the National Cancer Institute, and the Society for Nicotine and Tobacco Research.

The keynote address that day was by Saul Shiffman, who is a renowned tobacco researcher at the University of Pittsburgh. His address really set the tone for the day. The tone was focused on innovation of all sorts and also, and importantly, I think, on the practical significance of what everyone was working on. Personally I was most impressed with our panel of tobacco researchers. I've had the pleasure of knowing and working with Megan and Lisa for some time now. Getting to the opportunity to meet and listen to Robin Mermelstein and Tom Piasecki and Danielle McCarthy for the first time was a pleasure. The work that they're doing spans from everything from prevention of early smoking experimentation, all the way to helping two pack a day smokers successfully quit. All of it is so important for the nation's health.

Personally, as a quantitative researcher, I just find it always to be really grounding and humbling to spend time with researchers who are knee deep in the study of human behavior, and also who are out in the field working with people. As quantitative scientists, we don't get that very often.

Aaron: Our listeners have heard Megan and Lisa mention the time varying effect model. If a user wanted to learn more about TVEM or other methods discussed at the workshop, where should they start?

Stephanie Lanza: TVEM is a method that we have been working on pretty intensively at the center for the past few years. As you mentioned, other important methods for modeling EMA data were also covered at the workshop. We were really fortunate to have Donald Hedeker from the University of Illinois, Chicago present some of his methods for analyzing EMA data. He spoke about something called the location scale model, which is useful for understanding why processes become more or less stable over time. We also had Daniel Rivera from Arizona State University, who by the way, is a frequent collaborator of Linda Collins, our center director. He presented on dynamical systems modeling, where concepts from engineering, where his background is in chemical engineering, those concepts are used to inform the development of treatments that could be designed to adapt over time in response to an individual's changing needs.

Don and Daniel both presented those interesting methods, and then Renzi Lee presented. He's in our center, working with me. He presented an introduction to TVEM, the time varying effect model. The slides from Renzi's talk, Daniel's talk and Don Hedeker's talk all can be found on the Methodology Center's website. You can also find there links to more information about what these researchers are up to.

In addition to the talks that I just mentioned, Megan Piper and I presented a very accessible, hands on demonstration of the time varying effect model at the pre-conference workshop. I think that's a good place for people to start if listeners want to check out what is TVEM, how might I get started? They might want to look at our presentation and also a paper that has recently appeared in Prevention Science and it's available online. As a starting point to learn more about TVEM. All of this can be found at the center's website.

Aaron: Thanks, Stephanie. Not to overwhelm listeners with different places to get resources, but if you're interested in Daniel Rivera and Linda Collins' work, there's also a podcast that they did together that you can find at the same place you found this podcast.

Stephanie Lanza: That's right.

Aaron: Let's talk for a minute about the upcoming issue of Nicotine and Tobacco Research. Why is the special issue needed?

Stephanie Lanza: Well, the workshop in Houston was very successful and well attended, but we really wanted to formalize what was achieved there by compiling a set of applied and more technical papers. I think more importantly we wanted to broaden our impact so that the information reaches tobacco researchers everywhere. The potential to improve our understanding with smoking addiction and successful quit attempts partially lies within the EMA data that have been already collected or that will collected in future studies as part of the innovative research that's being conducted by scientists all over.

We're really hoping that this special issue will help these researchers harness the power of their EMA data so that they can move the field forward.

Aaron: What can you say to researchers who might be thinking of submitting an article to the special issue? What are you and the other editors looking for?

Stephanie Lanza: We're really looking for fresh ideas related to the collection of, or the analysis of EMA data in nicotine and tobacco research. Papers could focus on any aspect of tobacco research, including the etiology of use, the development of dependence, withdrawal phenomena, treatment effects and so on.

Also interested in the newer topic of behavioral interventions that are administered via smart phones in the context of an EMA study. These are sometimes called Ecological Momentary Interventions, or EMI's. Any researcher who is interested in submitting a paper should prepare a one page summary of their proposed paper and submit it to us by September 30th. The full call for papers along with how to submit the one page proposals can be found on our website.

Aaron: What do you see as the potential impact of TVEM and the other new methods that were featured in the workshop and that will be featured in the special issue?

Stephanie Lanza: Our hope is that in the next three years or so, I say that because that's how long our RO1 will be funded for, the research that we do will advance our basic knowledge about the dynamics of smoking cessation, as well as the effectiveness of six different drug therapies in impacting those dynamics. This information could potentially guide the next generation of smoking cessation treatments, many of which will be designed to adapt with the changing needs of individuals during their quit attempts.

The other new methods also featured in the pre-conference workshop hold similar potential for the field. We're definitely planning to highlight this potential in this special issue. Even beyond smoking cessation though, Aaron, there's enormous potential in the application of these new methods to intensive longitudinal data collected by researchers in other areas.

Aaron: Yeah.

Stephanie Lanza: For example the obesity epidemic in the US presents one of the most significant public health challenges for the coming years. Food choices are complex and varied throughout the day. They also can be heavily influenced by context. For example, food choices at a fast food restaurant, the stress before a major mid-term exam, and children's exposure to maybe family meals around the dinner table. Physical activity is also a similarly complex behavior and is a constantly moving target.

EMA studies conducted on smart phones as well as wearable devices like pedometers, are being used more and more in obesity studies. These studies can result in an unprecedented amount of data that can be just overwhelming for the researcher. That's one place where new methods like TVEM can come into play. It's going to be a really exciting time for behavioral scientists.

Aaron: Well, that is exciting.

Stephanie Lanza: Yes.

Aaron: Finally, when should our listeners expect to see this special issue?

Stephanie Lanza: Well, as you probably know, the production of issues like this can take a while. We anticipate actually seeing this special issue in print in late 2013. If you want to keep an eye out for it, keep an eye on the Nicotine and Tobacco Research journal's website, and also the Methodology Center's website. It will be announced in our e-news.

Aaron: Stephanie, thank you very much.

Stephanie Lanza: Thanks, Aaron.

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**Reference**

Shiyko, M. P., Lanza, S. T., Tan, X., Li, R., &  Shiffman, S. (2012). Using the time-varying effects model (TVEM) to examine dynamic associations between negative affect and self confidence on smoking urges: Differences between successful quitters and relapsers. Prevention Science. PMCID: PMC3372905 doi: 10.1007/s11121-011-0264-z [View abstract](http://www.ncbi.nlm.nih.gov/pubmed/22246429?dopt=abstract)

**Resources**

* [Read the call for articles](http://methodology.psu.edu/news/call_for_papers_ntr) for the special issue (Call open until October 1, 2012)
* View the [preconference workshop presentations](http://methodology.psu.edu/news/news/533-srnt12) discussed in the podcast
* Read about Methodology Center work on [Time-Varying Effects Models](http://methodology.psu.edu/downloads/tvem)