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Georgia Southern Presents Inequalities and Approximations of Weighted Distributions

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Weighted distributions occur naturally in probability and statistics, and provide an approach to dealing with model specification and data interpretation problems. Applications of weighted distributions to biased samples can be seen in various areas including medicine, ecology, reliability, and branching processes.

In this note, stochastic comparisons and results for weighted and Lindley models are presented. Approximation of weighted distributions via Lindley distribution in the class of increasing failure rate (IFR) and decreasing failure rate (DFR) weighted distributions with monotone weight functions are obtained including approximations via the length-biased Lindley distribution. Some useful bounds and moment-type inequality for weighted life distributions and applications are presented. Incorporation of covariates into Lindley model is considered and an application to illustrate the usefulness and applicability of the proposed Lindley-Cox model is given.


Dr. Broderick O. Oluyede, professor of statistics at Georgia Southern University (GSU) was the lead author. Dr. Macaulay Okwuokenye, alumni of the Doctor of Public Health in Biostatistics program at the Jiann-Ping Hsu College of Public Health (JPHCOPH) at GSU, and Dr. Karl E. Peace, professor of biostatistics at JPHCOPH and Georgia Cancer Coalition Distinguished Cancer Scholar were co-authors.

Link to article:
Georgia Southern study shows overweight and obese teens think they’re ‘just fine’

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As national obesity rates have risen over the last 20 years, overweight and obese adolescents are now less likely to accurately perceive their body weight, according to a recent study at Georgia Southern.

The study, “More Overweight Adolescents Think They Are Just Fine,” is being published in the upcoming issue of the American Journal of Preventative Medicine, and is part of a series of research initiatives led by Dr. Jian Zhang, associate professor of epidemiology in the Jiann-Ping Hsu College of Public Health.

While previous papers have focused on the parents of preschoolers and school-aged children, Zhang says this study focuses on the adolescents themselves, both because of their growing independence from parents and because of a diminishing likelihood they will outgrow their obesity as adults.

“It’s estimated that about a third of obese preschoolers and half of obese school-aged children — including adolescents — will become obese adults,” he said. “Adolescents with accurate self-perceptions of their body weight have greater readiness to make weight-related behavioral changes and are more effective in making the changes. By contrast, overweight adolescents who do not perceive their weight status properly are less likely to desire weight loss, and are more likely to have a poor diet.”

Zhang and researchers from Georgia Southern and Fudan University in Shanghai, China, compared data from adolescents ages 12-16 who participated in the National Health and Nutrition Examination Survey (NHANES) in 1988-1994 and in 2007-2012. Respondents were asked if they thought they were overweight, underweight or just about the right weight.

The study revealed that overweight or obese adolescents from the most recent survey were 30 percent less likely to accurately perceive their body weight compared to adolescents from the earlier survey.

The researchers suggest that a combination of issues may be the reason for this change in perception. As the prevalence of obesity has more than doubled in adolescents over the last 20 years, Zhang believes our socially accepted standards for “normal weight” may be shifting accordingly.

In addition, researchers pointed to social comparison theory as a possible explanation. According to the theory, individuals compare themselves to others, rather than to some scientific standard such as the Body Mass Index (BMI).

“In the wake of an obesity pandemic, a teenager is more likely to compare his or her body size to peers or friends, or anyone she or he sees daily,” said Andrew Hansen, Dr.P.H., assistant professor of community health behavior and education and spokesman for the research group. “Teenagers are less likely to use growth charts and biologic tools to measure their weight, but are more likely to socially compare or associate their weight to what they feel is normal.”

Because of these factors, Zhang says exploring new strategies to correct these body weight misperceptions are more urgent than ever, and that parents are a key factor in every one.

“As parents, we need to proactively create a conducive family environment to engage kids with a healthy lifestyle — clearly let our teens know that we care,” he said. “It is also crucial that we proactively discuss weight issues with doctors to make sure youths are on a healthy growth track.”

Zhang says parents should also serve as role models, watching their own weight and focusing on healthy lifestyles instead of weight control to protect their teens attitude about body image.

“This doesn’t have to be an anti-obesity campaign,” said Hansen. “This can be a pro-health campaign.”