1. INTRODUCTION

The development of a succinct and accurate method to measure food security with precision began in the early 1990s as researchers developed a set of questions to capture the dimension underlying individual and household indicators (Campbell, 1991). The objective was to assess whether households have access to sufficient quantities of food to fully meet their basic needs – that is, whether they are food secure or insecure (Campbell, 1991; Cohen and Burt, 1990). These concepts were refined by an expert working group of the American Institute of Nutrition and were published by the Life Sciences Research Office (LSRO) of the Federation of American Societies for Experimental Biology (Anderson, 1990). (See *Household Food Security in the United States, 1998 and 1999: Detailed Statistical Report,* Cohen et al, 2002, for a full description of the conceptual and practical development of food security measurement).

Using the April 1995 CPS data, USDA, USDA contractors, and cooperating Federal agencies developed a food security scale based on 18 of the CPS questions. This was done using an Item Response Theory (IRT) statistical model, which posits an underlying latent variable (in the present context, food insecurity and hunger) that cannot be observed directly but can be estimated from respondent answers to a set of instrument items. A relative "severity" is calculated for each of the 18 survey questions on which the food security model is based, ranging from such low-severity items as whether the respondent "worried whether our food would run out" to very severe items, such as a child skipping a meal because no food was available. The household's food security scale score is computed on the basis of the total number of affirmative answers to the 18 increasingly severe food security questions (or 10 questions if no children are present in the household). This scale is then divided into ranges of severity that categorize households as being food secure, food insecure with no hunger evident or food secure with hunger evident.

A series of USDA papers and reports have presented and compared the prevalence of food insecurity and hunger, nationally and by state for 1995-1999, and

have begun to explore various technical measurement issues. The reports include:
"Household Food Security in the United States in 1995, Summary Report of the Food Security Measurement Project." Hamilton, W. et al., 1997a; *"Household Food Security in the United States in 1995, Technical Report."* Hamilton, W. et al., 1997; *"Household Food Security in the United States, 1995-1997: Technical Issues and Statistical Report."* Ohls, J., L. Radbill, and A. Schirm, 2001; *"Household Food Security in the United States, 1995-1998, Advance Report."* Bickel, G., S. Carlson, and M. Nord, 2000; *"Prevalence of Food Insecurity and Hunger, by State, 1996-1998"* Nord, M., K. Jemison, and G. Bickel, 1999; *"Household Food Security in the United States, 1999."* Andrews, M., M. Nord, G. Bickel and S. Carlson, 2000; *"Household Food Security in the United States, 1998 and 1999: Detailed Statistical Report.*" Cohen, B., J. Parry, and K. Yang, 2002.

This report complements these reports by analyzing and discussing four key technical issues of the CPS Food Security Supplement. These include: the development of procedures for estimating standard errors; an assessment of the feasibility of using the generalized variance functions (GVFs) developed by the Census Bureau for estimating standard errors, instead of directly estimating standard errors using balanced repeated replication (BRR) procedures; the effect of the alternation of survey periods between April and August/September for the CPS Supplement over the years 1995 - 1999; and the implications of using different IRT modeling approaches and software to create the food security scale. Prior to presenting these issues in chapters 3-5, the following chapter presents data issues that are unique to the 1998 and 1999 Food Security Supplements.