National Center for Risk and Economic Analysis of Terrorism Events
University of Southern California

Does Enhanced Security Improve Business Performance?

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Final Report

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About CREATE

The National Center for Risk and Economic Analysis of Terrorism Events (CREATE) was the first university-based Center of Excellence (COE) funded by the Office of University Programs (OUP) of the Science and Technology (S&T) Directorate of the Department of Homeland Security (DHS). CREATE started operations in March of 2004 and has since been joined by additional DHS centers. Like other COEs, CREATE contributes university-based research to make the nation safer by taking a longer-term view of scientific innovations and breakthroughs and by developing the future intellectual leaders in homeland security.

CREATE's mission is to improve homeland security decisions and operations to make our nation safer. We are accomplishing our mission through an integrated program of research, education and outreach that is designed to inform and support decisions and operations faced by elected officials and governmental employees at the national, state, and local levels. We are also working with private industry, both to leverage the investments being made by the DHS in these organizations and to facilitate the transition of research toward meeting the security needs of our nation.

CREATE employs an interdisciplinary approach merging engineers, economists, decision scientists, and system modelers in a program that integrates research, education and outreach. This approach encourages creative discovery by employing the intellectual power of the American university system to solve some of the country's most pressing problems. The Center is the lead institution where researchers from around the country come to assist in the national effort to improve homeland security through analysis and modeling of threats. The Center treats the subject of homeland security with the urgency that it deserves, with one of its key goals being to produce rapid results by leveraging existing resources so that benefits accrue to our nation as quickly as possible.

By the nature of the research in risk, economics, risk management and operations research, CREATE serves the need of many agencies at the DHS, including the Transportation Security Administration, Customs and Border Protection, Immigration and Customs Enforcement, Federal Emergency Management Agency and the U.S. Coast Guard. In addition, CREATE has developed relationships with clients in the Offices of National Protection and Programs, Intelligence and Analysis, the Domestic Nuclear Detection Office and many State and Local government agencies. CREATE faculty and students take both the long-term view of how to reduce terrorism risk through fundamental research, and the near-term view of improving the cost-effectiveness of counter-terrorism policies and investments through applied research.

Acknowledgements

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List of Acronyms

ANOVA: Analysis of Variance

ARENA: Sports Arena

BENS: Business Executives for National Security

CBRN: Chemical, Biological, Radiological, Nuclear

CC: Convention Center

CCTV: Closed-Circuit Television

CEDR: Center for Economic Development Research

CGE: Computable General Equilibrium

CM: Countermeasure(s)

CREATE: Center for Risk and Economic Analysis of Terrorism Events

CTA: Chicago Transit Authority

DHS: Department of Homeland Security

GDP: Gross Domestic Product

HVS: HVS Global Hospitality Services (Consulting Firm)

IMPLAN: Impact Analysis for Planning

I-O: Input-Output

MACC: Metropolitan Area Convention Center

MLB: Major League Baseball

MSA: Metropolitan Statistical Area

NAICS: North American Industry Classification System

NBA: National Basketball Association

NHL: National Hockey League

OMB: U.S. Office of Management and Budget

PCVB: Philadelphia Convention & Visitors Bureau

RVI: Random Vehicle Inspections

SD: Standard Deviation

STADIUM: Sports Stadium

WTP: Willingness to Pay

ZIP: Zone Improvement Plan

Executive Summary

1. Introduction

Public and private decision-makers can choose from a wide array of terrorism countermeasures, such as metal detectors, bag checks, security personnel, and closed-circuit television (CCTV) cameras. It is in policy-makers and proprietors' best interests to understand how such security solutions might positively or negatively impact venue attendance. Terrorism countermeasures may have features that could feasibly inconvenience or upset patrons, or in contrast, that may enhance public confidence in venue safety. Any of these impacts could contribute to security measures' "spillover effects" on attendance and profits. Specific examples of negative spillover effects include delays, inconvenience, and intrusion of privacy. Positive impacts could stem from a feeling of increased safety in relation to both ordinary crime and terrorism that improves the business environment.

This study analyzes the economic impacts of spillovers from terrorism countermeasures at three commercial mass gathering, or public assembly, sites. We emphasize that we are *not* evaluating the effectiveness of the countermeasures in reducing terrorism itself, but rather evaluating patrons' *perceptions* of these countermeasures and implications of these perceptions on attendance and hence economic activity. The empirical core of our analysis was the administration of surveys to patrons of a Major League Baseball Stadium, an Arena that hosts both National Hockey League and National Basketball Association teams, and a Metropolitan Area Convention Center. Our findings indicate that a large portion of patrons of these public assembly venues viewed security with respect to both terrorism and ordinary crime as an important influence on their likelihood of attending events there. Our analysis also indicates that many patrons view the negative spillovers of inconvenience from delays or invasion of privacy as minor compared to increases in safety. We conducted a sensitivity analysis that indicates our basic conclusions are robust to a range of assumptions related to interpretation of customer survey responses regarding venue attendance.

2. Site Selection

The U.S. Department of Homeland Security has identified commercial facilities as one of 18 critical infrastructure sectors (https://www.cisa.gov/commercial-facilities-sector). DHS has further specified eight sub-sectors of the commercial facilities sector as critical infrastructure: entertainment and media, gaming, lodging, outdoor events, public assembly, real estate, retail, and sports leagues. Our study of countermeasures against terrorism focuses on one of those sub-sectors, public assembly (e.g., arenas, stadiums, aquariums, zoos, museums, convention centers).

We sought to identify a representative sample of venues spanning the public assembly sub-sector of commercial facilities and distributed geographically across the U.S. More than two dozen sites were chosen as preliminary candidates, but the list was narrowed for several reasons. We then invoked several criteria in our selection process to ensure that the venues

utilized a variety of countermeasures and that these were installed or upgraded within recent years so that they would likely be salient to customers of the venue. In consultation with DHS Protective Security Advisors (PSAs) and the Business Executives for National Security (BENS) organization, we partnered with three sites. Because of confidentiality concerns, however, we are not able to reveal venue identities but note that they represent:

- Stadium that hosts a Major League Baseball team
- Arena that hosts both National Basketball Association and National Hockey League teams
- Metropolitan Area Convention Center that hosts a broad range of events

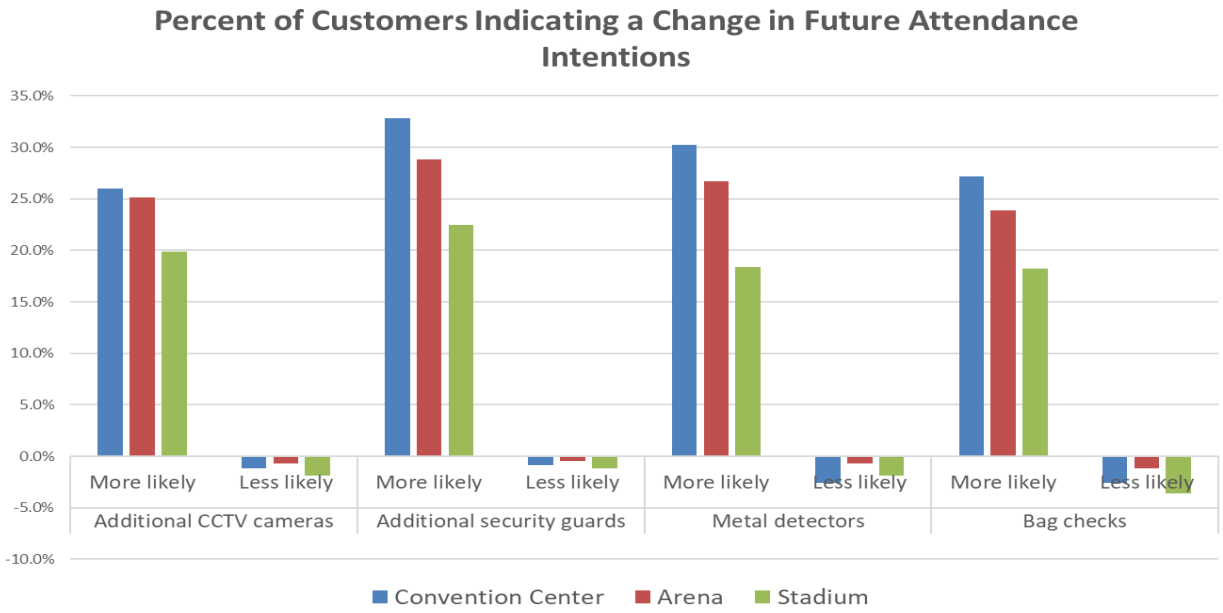
3. Surveys

To collect the data needed to perform our analysis, we first undertook reference surveys for four venue types and 10 different countermeasures, surveys for each of the three selected sites, and a set of management interviews for each of the selected sites.

Reference surveys included 1,664 respondents from a U.S. national adult sample of recent patrons of shopping malls, stadiums, concert halls, and convention centers. Customers reported little impact of countermeasures on their enjoyment of attending events, with inconvenience and invasion of privacy across all four venue types and all countermeasures considered. On average, customers perceived that countermeasures were effective in reducing the risk of crime, and somewhat effective in reducing the risk of terrorism. A large majority of customers indicated that increased countermeasures would have no impact on their future attendance of events at the venue. Between 15% and 49% of customers indicated they would be more likely to attend events at the venue with increased utilization of countermeasures for security, suggesting a substantial positive spillover effect that depends on the venue type and countermeasure deployed. Only a very small proportion (under 3%) of customers indicated that increased use of countermeasures would decrease their likelihood of future attendance.

A total of 1,276 adult customers completed a modified version of the reference surveys tailored to three geographically diverse metropolitan venues (a convention center, an MLB stadium, and a sports arena for both NHL and NBA teams). These specific venue surveys focused on four countermeasures whose deployment had increased in recent years: CCTV, law enforcement patrols, metal detectors at entry checkpoints, and bag inspections at entry checkpoints. All respondents reported being either recent customers (previous four years), past customers (over four years ago), or having considered attending the venue in the past or in the future.

Countermeasures were perceived as somewhat more effective in reducing the risk of crime than terrorism. A large majority of customers believe they are safer because of the countermeasures and are willing to accept minor inconveniences or an invasion of privacy. Deployment of additional security measures does not affect intentions to attend events for a large majority of the customers. As indicated in the figure below, between 18% and 33% of customers would increase their likelihood of attending events, depending on the venue and



countermeasure with increased deployment; only a small group (less than 3%) indicated a decreased likelihood of attendance due to increased use of countermeasures.

4. Valuation of Positive and Negative Spillover Effects

Customer valuations of specific countermeasure attributes were calculated by asking survey respondents to indicate whether they preferred the status quo to an alternative security environment with different characteristics. The characteristics considered were both direct impacts (the magnitude of risk reduction achieved by new countermeasures) and spillover effects (change in wait times, invasion of privacy, impact on terrorism relative to regular crime). Customers' willingness to pay for each of these characteristics was individually estimated by comparing the relative importance of these characteristics to the relative importance of price increases.

While many customers indicated that they would pay more than $5 (the highest cost increase presented) for additional countermeasures, these values were invariant to the specific attributes of the countermeasures (such as magnitude in risk reductions or associated wait time increase). This indicates an underlying willingness to pay for countermeasures but not a willingness to pay for the attributes of the countermeasures themselves. 48% of survey respondents indicated they would pay at least $5 for a 90% reduction in risk, but 38% of survey respondents were willing to pay at least $5 for only a 10% reduction in risk. This lack of responsiveness to the actual magnitude of the risk reduction indicates that it is not actually risk reduction that the customers value but the act of increasing countermeasures.

Specific values of countermeasure attributes indicated that the value of each additional percentage point reduction in risk was about $0.015 per person and the value of each additional minute of avoided wait time was $0.03 per person. There was no evidence that

customers placed a value on the privacy invasion associated with countermeasures nor was there an impact of countermeasures targeted towards crime rather than terrorism.

5. Ticket Revenue and Regional Economic Impact Analysis

Table ES-1 summarizes the survey results on changes in the likelihood of attendance at the venues motivated by the implementation of the terrorism countermeasures. These results are multiplied by the survey results on average ticket prices to arrive at changes in ticket sales revenue for our best estimate, which we have designated as a "lower-bound." The venue for which the existence of countermeasures has the likely greatest effect on ticket sales revenue is the Metro Area Convention Center (MACC), despite its low average ticket prices relative to the other venues. The major factor influencing this result is that this venue has the highest number of respondents indicating that countermeasures have had an increased effect on their attendance. At the other end of the range is the NHL team at the Sports Arena, despite having the highest ticket prices of any venue.

The results of a regional economic impact analysis of the increased attendance for the three venues/four event types are presented in Table ES-2. The largest impacts are associated with the MACC, where the $378 million additional direct spending on goods and services, such as transportation, food off-site, and hotels, translates into $735 million of total additional economic output (sales revenue) in the Metro Area that hosts this site, $463 million of additional Gross Domestic Product (GDP), $287 million of personal income, and 6,166 additional jobs. The main reasons for this outcome are that patrons attending convention

Table ES-1. Changes in Attendance and Ticket Sales due to the Implementation of Countermeasures – Lower-Bound Estimate

Venue	Attendees from the MSA			Attendees from outside the MSA			Total Change in Ticket Sales (10^6 2018$)
	Change in Attendance		Change in Ticket Sales (10^6 2018$)	Change in Attendance		Change in Ticket Sales (10^6 2018$)	
	Percent	Amount (10^3)		Percent	Amount (10^3)		
MLB	23.8%	482	24.9	20.8%	201	10.3	35.2
NBA	41.2%	242	18.5	45.8%	41	3.8	22.3
NHL	11.7%	79	7.1	8.4%	9	0.8	7.9
MACC	42.8%	704	34.2	60.0%	434	25.2	59.4

center events tend to stay for a longer time and have an average higher daily spending than for the other events, and they are also likely to travel a greater distance, especially for conferences.

The most impacted sectors across the four venues are those associated with direct tourism spending, such as Performing Arts & Spectator Sports, Retail Trade, Accommodations, Food Services & Drinking Places, and Transit & Ground Passengers Transportation. Other sectors that were most stimulated through intersectoral linkages (the supply-chain and wage/salary spending effect) include Real Estate, Professional, Scientific & Technical Services, Health Care, and Wholesale Trade.

Table ES-2. Summary Economic Impacts of Increased Attendance at the Four Venues on their MSA Regions – Lower-Bound Estimate

	Output (10^6 $)	GDP (10^6 $)	Income (10^6 $)	Employment (# of jobs)
MLB Stadium	113	68	46	1,075
NBA Arena	21	13	8	202
NHL Arena	5	3	2	44
MACC	735	463	287	6,166

Note: Output, GDP, Income Impacts are in millions of 2018$; Employment Impacts are in number of jobs.

6. Conclusion

Results from the customer surveys for three different public assembly venues indicate that commonly utilized security measures are perceived as having substantial efficacy in reducing both crime and terrorism risk. Any potential concerns about privacy and inconvenience are reported as relatively minor annoyances compared to the benefits of enhanced safety afforded by increased deployment of the four countermeasures currently in use at these three venues. Nearly all customers indicated that additional countermeasures to bolster security would either increase their attendance at future events at the venue or would not affect their current level of attendance. We detected nearly zero negative spillover impacts from additional utilization of these four countermeasures at the three venues studied.

Major findings include:

- Countermeasures are perceived as effective for improving safety, particularly with respect to crime.
- Countermeasures generally are not perceived as an invasion of privacy and are only mildly perceived as an inconvenience.
- Future attendance for a large majority of customers was unaffected by additional countermeasures.

- Enhanced countermeasures would increase the likelihood of attending future events for about 25% of customers.
- Less than 3% of customers would decrease their likelihood of attending events with additional countermeasures.
- Willingness to pay for risk reduction is approximately 15 cents per 10 percentage points reduction per person.
- Willingness to pay for a reduction in wait times is approximately 15 cents per five minutes per person.
- Presence of countermeasures is likely to increase attendance annually by between 10% and 50% across venues.
- Increased attendance results in an increase in ticket sales revenue of up to $60 million annually for the Convention Center.
- Increased attendance results in an increase in regional GDP of up to $463 million annually for the case of the Convention Center.
- Sensitivity tests indicate the results are robust.

Chapter 1. Introduction and Overview

Adam Rose and Richard John, Leads

1. Introduction

In recent years, there have been many high-profile attacks on large, relatively unprotected venues, including entertainment and shopping complexes in the U.S. and around the world. Such events often take the form of shootings, explosive detonations, or vehicle attacks, and they highlight the need for proprietors and owners to reduce the vulnerability of these "soft targets" to assault by terrorist and/or criminal actors.

Public and private decision-makers can choose from a wide array of terrorism countermeasures, such as metal detectors, bag checks, security personnel, and closed-circuit television (CCTV) cameras. It is in policy-makers and proprietors' best interests to understand how such security solutions might positively or negatively impact venue attendance. Terrorism countermeasures may have features that could feasibly inconvenience or upset patrons, or in contrast, that may enhance public confidence in venue safety. Any of these impacts could contribute to the security measures' "spillover effects" on attendance and profits. Specific examples of negative spillovers include delays, inconvenience, and intrusion of privacy. Positive impacts could stem from a feeling of increased safety in relation to both ordinary crime and terrorism that improves the business environment.

This study analyzes the economic impacts of spillovers from terrorism countermeasures at three commercial mass gathering, or public assembly, sites. We emphasize that we are *not* evaluating the effectiveness of the countermeasures in reducing terrorism itself, but rather evaluating patrons' *perceptions* of these countermeasures in relation to their patronage. A pioneering aspect of the study is the collection of data by surveys of business customers with respect to specific sites and countermeasures.

The empirical core of our analysis was the administration of surveys to patrons of a Major League Baseball Stadium, an Arena that hosts both National Hockey League and National Basketball Association teams, and a Metropolitan Area Convention Center. Our findings indicate that patrons of these public assembly venues viewed security with regard to both terrorism and ordinary crime as a strong influence on their likelihood of attending events there. Our analysis also indicates that patrons view the negative spillovers of inconvenience from delays or invasion of privacy as minor compared to increases in safety. We conducted a sensitivity analysis that indicates our basic conclusions are robust to a range of assumptions related to interpretation of customer survey responses regarding venue attendance.

2. Literature Review of Public Perception of Security Measures[1]

We provide a synthesis of the literature on public perceptions of terrorism countermeasures at public assembly sites that relate to their likely effect on patronage (attendance), and hence on business activity. We confine our attention to research based on survey data. Appendix 1A presents a summary of the important aspects of the reviewed studies.

Five studies surveyed respondents about the importance of closed-circuit television (CCTV) as a security measure against terrorism and/or crime. In four of these five studies, respondents had positive views of CCTV, rating it as important. In only one paper, surveying hotel guests in Thailand about terrorism, was CCTV rated neutral or unimportant by respondents as a general security feature (Rittichainuwat and Chakraborty, 2012). Chan and Lam (2013) found Hong Kong hotel guests rated CCTV as important to very important for terrorism and crime (mean (M)=4.39/5) and high compared with other security features (5^{th}/32). Feickert et al. (2006), surveying U.S. hotel guests about hotel security less than a year after 9/11, found respondents rated CCTV highly. Overstreet and Clodfelter (1995) found 70% of U.S. mall shoppers surveyed thought CCTV was important or very important for crime prevention. Yavuz and Welch (2010), using Chicago transit customer satisfaction survey data, found CCTV being rated very slightly on the positive side of neutral (M=3.06/5) to alleviate the perceived risk of crime and disorderly behavior (drinking, noise, panhandling).

Individuals were asked about metal detectors in three studies, including walk-in metal detectors and those applied to luggage and vehicles to specifically counter terrorist bombing threats. Chan and Lam (2013) surveyed tourists staying at Hong Kong hotels, asking about the importance of 32 hotel safety and security systems, including metal detectors. Attitudes towards metal detectors were neutral to somewhat important (M=3.01/5). However, their overall rank was much lower than other security measures (28th/32). In a study questioning tourists in Thailand by Rittichainuwat and Chakraborty (2012), over 50% of respondents rated metal detectors for persons, vehicles, and luggage as important, compared with 15% rating these measures as unimportant. A final study by Feickert et al. (2006), based on survey data from U.S. hotel guests, rated metal detectors as neutral in terms of importance to patrons.

The presence of guards and patrols was examined in four papers. Chan and Lam (2013) found respondents at Hong Kong hotels ranked 24-hour guards as very important for crime and terrorism risks (M=4.41/5) and 6th out of 32 security features. Feickert et al. (2006) found respondents that stayed at U.S. hotels had a negative view of armed guards. Overstreet and Clodfelter (1995) surveyed consumers about crime at U.S. malls and found that 88% of respondents rated security patrols in parking lots as important or very important. Finally, Yavuz and Welch (2010), using data from a 2003 Chicago Transit Authority customer satisfaction survey, found neutral to positive attitudes towards the presence of police and security personnel to lower perceived risk of crime and disorderly behavior.

[1] This Section was co-authored by Chris Covino.

2.1. Public Perception of Risk and Patronage

Rittichainuwat and Chakraborty (2009), surveying tourists visiting Thailand, found that 44% of respondents reported that terrorism would not stop them from traveling, while 38% said they would stop traveling if there was a danger from terrorism. A separate survey of tourists done by Law (2006) in Hong Kong found that tourists would likely change plans if there was a risk to their safety, specifically from infectious diseases, natural disasters, or terrorist attacks (M=3.92, 1-5 point scale: 1 = unlikely to 5 = likely). Toohey et al. (2003) surveyed attendees at the 2002 Soccer World Cup in South Korea; 85% of respondents were not worried about terrorist threats, 10% were concerned, and 1% expressed a high level of concern.

Yüksel and Yüksel (2007), after surveying tourists shopping in Southwest Turkey, concluded that perception of high risk environments while shopping was associated with lower customer satisfaction and loyalty intentions. Risks, such as street crime, encountered while shopping would limit activities in the future. Rittichainuwat and Chakraborty (2009) found that perceived risk from terrorist attack negatively affected the Thai hospitality industry. He concluded that the industry recovered from terrorist attacks by boosting tourist confidence with terrorism countermeasures, such as metal detectors, surveillance cameras, and vehicle checks, instead of by offering discounts.

Law (2006) found that the perceived terrorism risk of tourists visiting Hong Kong was mitigated by the introduction of surveillance systems and protection measures. Law surveyed tourists in Hong Kong about perceived risk and asked if "surveillance systems or protection measures would increase confidence when traveling." The introduction of surveillance systems or protection measures strengthened tourist confidence more likely than not (M=3.66, 1-5 point scale: 1 = very unlikely to 5 = very likely). Law concluded that surveillance systems could attract travelers and increase traveler confidence in the face of the perceived risk of terrorism.

Similarly, Chan and Lam (2013) found 68% of guests at Hong Kong hotels said that safety and security was an important factor when choosing a hotel. Chan and Lam concluded that knowing how guests perceive certain security measures can lead to competitive advantage, increases in customer loyalty, enhanced corporate image, and improved business performance.

Yavuz and Welch (2010), analyzing Chicago transit survey data, concluded that measures such as video cameras and police are among significant determinants of perceived risk of crime and social misbehavior and that a failure to address perceived risk with increases in security measures can result in fare box losses. The paper also concluded that women have a higher perceived risk of transit systems, and a failure to address that perceived risk can lower ridership. This decrease in ridership can have other effects because "many (women) depend on transit for access to employment, childcare, education, health, and the political process."

2.2. Spillover Effects on Patronage

Three studies asked respondents at sports venues about the impact of security on the enjoyment of the events held there. Overall attitudes towards security were neutral, with a minority (approximately 22-24%) saying security enhanced enjoyment and a smaller minority

(2-6%) reporting security detracting from enjoyment. Taylor and Toohey (2006) surveyed attendees at the 2003 Rugby World Cup and found 74.3% of respondents said that security had a neutral impact on enjoyment, with 23.8% reporting a positive impact and 1.9% a negative impact. Toohey et al. (2003) performed a survey during the 2002 Soccer World Cup in Korea and had a similar result. Approximately 70% of respondents reported that their satisfaction of the event was unaffected by the event security, 22% of respondents felt that the security enhanced satisfaction, and 6% stated that event security detracted from enjoyment. Finally, in a survey of spectators during the 2004 Summer Olympic Games in Greece by Taylor and Toohey (2007), spectators rated security as having a neutral-to-positive impact on enjoyment; the overall mean = 2.96 on a 1-5 point scale: negative impact =1 to positive impact = 5.

Rose et al. (2014) estimated spillover effects on business of two terrorism countermeasures, random vehicle inspections (RVI) and CCTV, using a survey of generalized countermeasures in Manhattan and a macroeconomic model. Results indicate that RVI could result in a 13.4% decrease in business activity due to a combination of delays and inconvenience, equating to an annual direct loss in business revenue of $1.7 billion and total annual (direct plus indirect) GDP loss of $2.9 billion across the greater New York City Metropolitan Area. CCTV was estimated to have a positive net impact, with improvements in the business environment through perceptions of improved safety against both terrorism and ordinary crime outweighing factors like invasion of privacy. For this countermeasure, the analysis projected a 4.16% increase in direct business activity, equating to an annual increase in direct business sales revenue of $545 million and total GDP increase of $1.1 billion.

Feickert et al. (2006), using survey data, found that U.S. hotel guests were willing to pay an additional 10% for security features that they found acceptable. This survey also found that women, or those respondents in general who were more in favor of overt security measures (armed guards, metal detectors, law enforcement background checks), were more willing to pay for added security features. In comparison, respondents who traveled frequently or were older were less willing to pay for security features. Rittichainuwat and Chakraborty (2009) surveyed travelers in Thailand and reported that 63% of respondents would not compromise personal safety from terrorist or disease risks in exchange for low travel costs.

2.3. Summary

Although there have been several studies of public perceptions of terrorism countermeasures at public assembly sites, very few have actually measured the “spillover” effects on patronage and business activity. Still, the various studies on public perceptions of countermeasures against terrorism and ordinary crime should prove useful to further analyses in terms of providing background on related issues and data points for comparison of our study. Of course, adjustments need to be made for important aspects of the studies, such as location, type of public assembly site, type of countermeasure, and method of analysis.

3. Site Selection

The U.S. Department of Homeland Security (DHS) has identified commercial facilities as one of 18 critical infrastructure sectors (https://www.cisa.gov/commercial-facilities-sector). DHS has further specified eight sub-sectors of the commercial facilities sector as critical infrastructure: entertainment and media, gaming, lodging, outdoor events, public assembly, real estate, retail, and sports leagues. Our study of countermeasures against terrorism focuses on one of those sub-sectors, public assembly (e.g., arenas, stadiums, aquariums, zoos, museums, convention centers).

We sought to identify a representative sample of venues spanning the public assembly sub-sector of commercial facilities and distributed geographically across the U.S. More than two dozen sites were chosen as preliminary candidates, but the list was narrowed for several reasons. For example, office buildings were eliminated at the outset because we believe that business transactions would not be influenced significantly by any positive or negative spillover effects. We also judged that hotels would not be affected, either positively or negatively. Other types of venues were not included because of their inability to meet the criteria below and for lack of willing partners. With the help of DHS Protective Security Advisors (PSAs) and the Business Executives for National Security (BENS) organization, we partnered with three sites. Because of confidentiality concerns, however, we are not able to reveal venue identities but note that they represent:

- Stadium that hosts a Major League Baseball team
- Arena that hosts both National Basketball Association and National Hockey League teams
- Metropolitan Area Convention Center that hosts a broad range of events

We invoked the following criteria in our selection process to ensure that the venues utilized a variety of countermeasures and that they were installed or upgraded within recent years, so that they would likely be salient to customers of the venue:

- Sites with at least three distinct types of countermeasures or configurations of countermeasures in place, either visible or hidden, and preferably at least one of each (enables us to analyze a critical minimum of countermeasures)
- Sites for which at least three countermeasures or configurations of countermeasures were newly installed or upgraded in the last three years (provides a minimum amount of time for customers to compare current countermeasures with an absence of these countermeasures or upgrades in place)
- Sites that are not too unique in terms of type of facility, vulnerability, geographic location, etc. (we want to be able to generalize to a broader set of sites from an individual site that is surveyed)
- Sites that represent a diversity of commercial categories, sizes, geographical locations, and racial/ethnic group patrons

4. Overview

Chapter 2 presents the design and results of a Reference Survey of patrons of a wide range of public assembly venues and countermeasures. The purpose of this survey is not to target the customer base of specific venues, but to establish a reference point of public attitudes from a broad population, against which findings from specific venue customer bases can be compared. Chapter 3 presents the design of the Customer Surveys for the three sites. The generic version of this survey, so as not to divulge the identity of the sites, is presented in the chapter appendix. Also, the four terrorism countermeasures of interest were common to all three sites. Chapter 4 presents and analyzes Customer Survey results for each venue and in aggregated form across all three venues. The chapter also presents the results of interviews of managers of the three sites. The responses were consistent with those of the Customer Surveys, in that managers generally believed the countermeasures had a positive rather than a negative effect on customer perceptions and attendance. Chapters 5 and 6 utilize results from the Customer Surveys to analyze the economic implications of patron perceptions of terrorism countermeasures. Chapter 5 analyzes the willingness to pay (WTP) for security and to avoid negative spillover effects. The results indicate a small but statistically significant WTP for security and to avoid delays but found no statistically significant effect with respect to avoiding invasion of privacy. Chapter 6 analyzes the impact of countermeasures on business revenues and on the regional economy in which the public assembly venues reside. The analysis estimated that countermeasures, on net, increase business revenue in the form of ticket sales from between $8 million and $59 million (in 2018 dollars) annually across the three venues and four types of events for our lower-bound estimates. The regional economic impacts also included associated expenditures on parking and concessions, lodging, transportation, and other items. The total impacts on regional gross domestic product (GDP), including multiplier effects, ranged from $3 million to $463 million annually. The GDP increase was greatest for the convention center, which attracts many more visitors from outside the metro area and for longer stays. While large in absolute terms, these figures still represent less than 0.05% of Year 2018 baseline GDP for any of the three regions.

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Chapter 2. Formulation and Description of the Reference Survey

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1. Introduction

The purpose of the surveys reported in this chapter is to measure public perceptions of the types of security measures that might be employed at public assembly venues and to anticipate whether the implementation of certain measures might cause spillover effects on business. The goal of these "reference surveys" is not to target the customer base of specific venues, but to establish a reference point of public attitudes from a broad population, against which findings from specific venues' customer bases can be compared. Note that these reference surveys do not specifically address the effectiveness of security measures; they focus exclusively on how they are perceived by the public, and thus whether their implementation might affect attendance or patronage at various venue types.

The methodology used for the reference surveys was developed by the CREATE research team and has been used in numerous studies designed to assess public beliefs, attitudes, values, and behavioral intentions related to a diverse assortment of extreme events, including terrorism, natural disasters, and man-made accidents. The current study, including the reference surveys of public perception of public assembly countermeasures, is an extension of the team's previous research assessing public reaction to real and simulated terrorism attacks, including biological attacks (e.g., flu virus, anthrax), radiological attacks, conventional explosive attacks on air transportation, soft-target ground transportation attacks, cyber-attacks, and missile attacks on passenger airplanes. See Appendix 2A for a bibliography of previous related CREATE studies on public perception of risk.

2. Venues and Countermeasures

The surveys reported in this chapter assessed knowledge, beliefs, attitudes, and behavioral intentions related to several public assembly countermeasures in four different types of venues: (1) shopping malls, (2) stadiums, (3) indoor concert halls, and (4) convention centers. While not exhaustive of all venue types, this selection spans the domains of shopping, entertainment, and business/professional activities.

To assess participants' overall familiarity with various security measures, the following security techniques were included in the surveys:

1. Closed-circuit television (CCTV) cameras
2. Uniformed security/law enforcement
3. Undercover or "plain clothes" security/law enforcement
4. Traffic barriers
5. Bomb-sniffing dogs
6. No firearms policy

7. Monitoring for chemical, biological, radiological, or nuclear agents
8. Walk-through metal detectors
9. Handheld metal detectors
10. Bag inspections

This list of countermeasures appeared in all venue surveys except the "shopping mall" survey, which omitted reference to walk-through metal detectors, handheld metal detectors, and bag inspections (as these measures are relatively uncommon at malls, in contrast to the three other venue types). All other questions in the surveys reference countermeasures that appear in this list.

3. Survey Format

Each reference survey included various categories of questions aimed at understanding participants' awareness of various security measures, their attitudes towards their effectiveness, and the potential impact of such security measures on customer behavior and attendance. The items included in each survey can broadly be categorized under the following topics:

- *Awareness of Countermeasures*: Participants were asked to indicate whether they had heard of or experienced the various security measures (see previous section) at their assigned venue.
- *Perceived Effectiveness of Countermeasures:* Participants were asked to rate specific measures in terms of whether they made venues safer and how they did so (e.g., deterrence, improved ability to apprehend criminals, etc.). For these items, the surveys specifically focused on CCTV, uniformed and undercover security, and traffic barriers.
- *Negative Attitudes Towards Countermeasures:* Participants also assessed whether specific countermeasures had negative effects on their venue experience, such as whether they believed certain countermeasures invaded their privacy. These items specifically focused on CCTV, uniformed security, undercover security, and traffic barriers. The convention center and concert hall surveys also assessed negative attitudes towards bag checks, which are relatively common at these venue types (as opposed to stadiums, which typically subsume bag checks under more in-depth security screening).
- *Countermeasures and Attendance Behaviors:* Participants also assessed how the implementation of such countermeasures would affect their intention to patronize a venue. These items focused on CCTV cameras, uniformed security, and traffic barriers.
- *Value Placed on Security:* Lastly, the surveys asked participants to rate how much value they placed on increased security at venues, in terms of financial cost (e.g., increased ticket prices) or time costs (e.g., waiting in a security line).

Copies of surveys for all four venue types appear in Appendix 2B.

4. Survey Procedure

Data were collected in two waves, in each of which participants completed one of two possible surveys. Shopping malls and stadiums were assessed in Wave 1, and convention centers and concert halls were assessed in Wave 2. All data were collected using Amazon Mechanical Turk (MTurk), a popular and generally well-validated source of online participants for behavioral research. Respondents in all data collection waves were compensated for their participation. In all surveys, respondents were eliminated for failing either one of two quality control attention check questions (detailed below) or for finishing in less than four minutes (minimum time required to read all questions and select responses). Table 2-1 presents demographic characteristics for all four samples.

Table 2-1. Demographic Characteristics for Each Venue Type Survey

		Wave 1		Wave 2	
		Shopping Mall	**Stadium**	**Concert Hall**	**Convention Center**
N		453	398	401	412
Gender	Male	52.5%	51.8%	55.1%	51.9%
	Female	47.5%	48.2%	43.9%	45.9%
Highest Level of Education	Less than HS	0.4%	0.0%	0.0%	0.2%
	HS Graduate	10.6%	8.5%	8.2%	7.5%
	Some College	23.2%	22.9%	20.4%	22.8%
	Associate Degree	11.9%	12.8%	10.7%	12.4%
	Bachelor's Degree	43.0%	43.0%	41.1%	39.3%
	Graduate Degree	10.8%	12.8%	18.7%	16.5%
% Caucasian		77.3%	75.6%	71.3%	70.6%
Age, Median		35	32	32	32
Age, 25th & 75th Percentiles		(29-45)	(28-41)	(27-40.5)	(27-39)

Note: Percentages may add to less than 100% due to non-responses to demographic items.

5. Respondent Selection

5.1. Survey 1: Shopping Malls & Stadiums

To qualify for the first wave of data collection, participants had to report that they 1) had visited a shopping mall in the past three years, or planned to within the next year, OR 2) had visited a stadium in the past three years, or planned to within the next year. Data were originally collected from 979 participants, all of whom passed at least one screening item. Participants who passed only the first screening item (shopping malls) (N = 93) were automatically assigned to complete the shopping malls venue survey, while those who passed

only the second screening item (stadiums) (N = 8) were automatically assigned to complete the stadium survey. Those who passed both screening items (N = 878) were randomly assigned to complete one of the two surveys, resulting in a total sample size of 528 for the shopping mall survey and 451 for the stadium survey.

Two quality control questions were embedded in the surveys: 1) what kind of venue their survey involved (three response choices), and 2) to answer "Yes" on a Yes-No item if they were paying attention to the survey. Respondents had to pass both attention check questions *and* have taken at least four minutes to complete the survey, which represents a little over half the median time to complete the survey. Applying these criteria resulted in a final sample size of 453 for the shopping mall survey and 398 for the stadium survey. The median completion time was 7.4 minutes for the shopping mall survey (middle 50% of data=5.8-10.0 minutes) and 7.9 minutes for the stadium survey (middle 50% of data=6.2-10.7 minutes).

5.2. Survey 2: Convention Centers & Concert Halls

To qualify for the second wave of data collection, participants had to report that they 1) had visited a convention center in the past three years, or planned to within the next year, OR 2) had visited an indoor concert hall in the past three years, or planned to within the next year. Only those MTurk workers who had not participated in the first data collection wave were invited to participate in Wave 2. Data were initially collected from 1,083 participants, 96 of whom failed both screening questions. An additional 63 responses were collected to supplement a comparatively low final sample size in the convention center survey, of whom 59 passed the single screening question. As in Wave 1, participants who only passed one screening item were assigned to the corresponding survey (convention centers N = 38 or concert halls N=67), with those who passed both (N = 887) being randomly assigned. There were 543 qualified respondents for the convention center survey and 503 for the concert hall survey, with final sample sizes of 412 and 401, respectively, for a final total sample size of 813 after excluding those who failed at least one quality control item and those who completed in less than four minutes (a little over half the median time to complete either survey). The median completion time was 7.3 minutes for the concert hall survey (middle 50% of data=5.6-9.8 minutes) and 7.4 minutes for the convention center survey (middle 50% of data=5.9-10.1 minutes).

6. Countermeasure Familiarity

Table 2-2 shows the proportion of participants reporting they had heard of or experienced various countermeasures at their assigned venue. Almost all participants had heard of or experienced at least one of the chosen countermeasures. Participants in the shopping mall survey reported less experience with certain items (traffic barriers, bomb-sniffing dogs, "no firearms" policies, and monitoring for toxic agents) than those in the other three surveys, whereas participants in the stadium survey reported more experience with certain measures (traffic barriers, bomb-sniffing dogs, "no firearms" policies, and metal detectors).

Table 2-2. Percentage Reporting Familiarity or Experience with Countermeasures by Venue Type

Countermeasure	Shopping Mall	Stadium	Concert Hall	Convention Center
CCTV cameras	87.9%	80.7%	70.3%	72.8%
Uniformed security/law enforcement	91.2%	94.2%	79.6%	82.3%
Undercover security/law enforcement	48.1%	57.0%	49.4%	40.3%
Traffic barriers	38.2%	58.3%	48.4%	45.6%
Bomb-sniffing dogs	19.0%	42.7%	27.9%	32.3%
No firearms policy	59.8%	81.4%	67.6%	71.4%
Monitoring for CBRN agents	7.9%	11.1%	15.7%	17.5%
Walk-through metal detectors	NA	80.7%	66.8%	71.4%
Handheld metal detectors	NA	71.6%	55.4%	54.9%
Bag inspection	NA	88.9%	76.1%	75.0%
Have not heard of or experienced any of these	4.0%	0.0%	1.0%	2.2%

7. Countermeasure Effectiveness in Mitigating Crime and Terrorism Risk

Participants were asked the degree to which they believed various measures reduced crime or the likelihood of a terrorist event at their assigned venue (1= 'Strongly disagree', 2= 'Disagree', 3= 'Neutral', 4= 'Agree', 5= 'Strongly agree'). Results appear in Table 2-3. A 4 (venue) x 3 (countermeasure) x 2 (crime vs. terrorism) mixed ANOVA found a significant main effect of countermeasure ($F(2,3314)=206.9$, $p<0.001$, partial $\eta^2=0.11$), risk (crime vs. terrorism; $F(1,1657)=366.9$, $p<0.001$, partial $\eta^2=0.18$), and venue ($F(3,1657)=6.24$, $p<0.001$, partial $\eta^2=0.01$). Security guards were generally perceived as more effective than CCTV and traffic barriers, while all three countermeasures were generally seen to be more effective against crime than terrorism and more effective in stadiums than in the other three venues (though this effect was small). Interestingly, there was also a notable interaction between countermeasure and risk type (partial $\eta^2=0.10$), such that traffic barriers were perceived as more effective than CCTV for preventing terrorism but less effective at preventing crime.

Table 2-3. Means (SD) of Perceived Effectiveness of Countermeasures to Deter Terrorism and Crime by Venue Type

Countermeasure	Activity Deterred	Mall	Stadium	Concert Hall	Convention Center
CCTV cameras	Crime	4.25 (0.79)	4.22 (0.92)	3.98 (0.89)	4.04 (0.96)
	Terrorism	3.40 (1.25)	3.78 (1.20)	3.49 (1.20)	3.53 (1.26)
Uniformed and undercover security	Crime	4.39 (0.73)	4.45 (0.77)	4.29 (0.81)	4.39 (0.83)
	Terrorism	3.78 (1.02)	4.13 (1.02)	3.96 (1.07)	4.00 (1.09)
Reconfiguring traffic flows	Crime	3.55 (1.00)	3.83 (1.04)	3.88 (0.96)	3.80 (1.04)
	Terrorism	3.57 (1.09)	3.83 (1.09)	3.83 (1.04)	3.74 (1.15)

Note: Values represent the degree to which respondents agreed that each countermeasure reduced crime and terrorism risk, on a 5-point Likert scale (1='Strongly disagree', 5='Strongly agree'). Table entries are means accompanied by standard deviations (SD).

8. Countermeasures and Overall Safety

Participants were also asked whether CCTV cameras, uniformed security, and undercover security improved safety at their assigned venue, and whether they contributed to specific aspects of a venue's ability to address crime and terrorism. Results appear in Table 2-4. Generalized estimation equations suggested no significant effect for venue (p=0.44), but found a significant effect for item and countermeasure (ps<0.001). Endorsements were highest for the first statement ("improves security and safety") and lowest for the terrorism-deterrent statement. Safety-related beliefs were also highest for uniformed security and lowest for undercover security (which was perceived as having less of an overall deterrent effect than the other two countermeasures). Both forms of security personnel (uniformed and undercover) were perceived as more capable of identifying and stopping criminals/terrorists *before* a crime than *after* a crime. The opposite was true for CCTV surveillance, which was perceived as more capable of identifying criminals and terrorists after an attack (much more so than security personnel) and less capable of detecting them beforehand.

9. Negative Perceptions of Countermeasures

Participants were asked for their agreement (1= 'Strongly agree', 5= 'Strongly disagree') with statements regarding the potential negative impact of countermeasures on customers' venue experience. Results are presented in Table 2-5. Respondents did not generally report strong negative attitudes towards any of the countermeasures, with none of the means being above the scale midpoint. CCTV cameras, undercover security, and uniformed security were perceived as contributing slightly more to reduced enjoyment and inconvenience in concert halls and convention centers than in shopping malls and stadiums. Of all the countermeasures assessed, bag checks (in the concert hall and convention center surveys) were rated as

contributing the most towards inconvenience and reduced enjoyment, though the average response was still below the inconvenience scale midpoint.

Table 2-4. Percentage of Respondents Endorsing Various Beliefs About Countermeasure Effectiveness

	Shopping Mall	Stadium	Concert Hall	Convention Center
CCTV Cameras				
Improves security & safety	86.8%	84.9%	88.0%	86.4%
Discourages criminals	80.1%	70.9%	69.6%	72.8%
Discourages terrorists	36.2%	47.7%	41.1%	44.2%
Easier to identify/arrest criminals & terrorists AFTER crime	93.6%	91.7%	91.3%	88.8%
Easier to stop criminals/terrorists BEFORE crime	49.0%	57.0%	50.6%	50.0%
Uniformed Security				
Improves security & safety	94.0%	94.5%	96.3%	96.8%
Discourages criminals	90.1%	85.2%	82.3%	84.0%
Discourages terrorists	52.3%	68.8%	56.6%	63.8%
Easier to identify/arrest criminals & terrorists AFTER crime	65.3%	69.6%	65.6%	62.6%
Easier to stop criminals/terrorists BEFORE crime	75.1%	79.1%	80.5%	79.4%
Undercover Security				
Improves security & safety	87.9%	90.2%	90.3%	89.6%
Discourages criminals	52.3%	47.2%	46.6%	46.4%
Discourages terrorists	30.9%	41.7%	37.4%	37.4%
Easier to identify/arrest criminals & terrorists AFTER crime	68.7%	74.1%	66.8%	62.6%
Easier to stop criminals/terrorists BEFORE crime	75.5%	80.9%	76.6%	77.7%

Table 2-5. Mean (SD) Agreement with Negative Perceptions of Countermeasures

	Shopping Mall	Stadium	Concert Hall	Convention Center
CCTV Cameras				
Makes my visits less enjoyable	1.92 (1.14)	1.88 (1.08)	2.45 (1.42)	2.39 (1.38)
Makes it less convenient to spend time here	N/A	N/A	N/A	N/A
Invade my privacy	2.19 (1.20)	2.17 (1.22)	2.64 (1.37)	2.57 (1.41)
Uniformed Security				
Makes my visits less enjoyable	1.81 (1.08)	1.90 (1.15)	2.41 (1.39)	2.19 (1.32)
Makes it less convenient to spend time here	1.70 (1.00)	1.85 (1.14)	2.30 (1.29)	2.25 (1.30)
Invade my privacy	1.66 (0.98)	1.74 (1.08)	2.29 (1.34)	2.15 (1.35)
Undercover Security				
Makes my visits less enjoyable	1.73 (1.06)	1.81 (1.10)	2.27 (1.31)	2.18 (1.34)
Makes it less convenient to spend time here	1.70 (1.02)	1.69 (1.03)	2.25 (1.36)	2.11 (1.32)
Invade my privacy	1.80 (1.08)	1.83 (1.15)	2.34 (1.33)	2.23 (1.37)
Traffic Barriers				
Makes my visits less enjoyable	2.03 (1.17)	2.10 (1.24)	2.43 (1.32)	2.35 (1.37)
Makes it less convenient to spend time here	2.24 (1.22)	2.63 (1.35)	2.60 (1.34)	2.51 (1.37)
Bag Checks				
Makes my visits less enjoyable	N/A	N/A	2.76 (1.39)	2.70 (1.39)
Makes it less convenient to spend time here	N/A	N/A	3.04 (1.42)	2.80 (1.41)

Note: Values represent the degree to which respondents agreed with each statement about the countermeasures, on a 5-point Likert scale (1='Strongly disagree', 5='Strongly agree'). Table entries are means accompanied by standard deviations in parentheses.

10. Countermeasure Implementation Impacts on Venue Attendance

Participants were asked whether the various measures would make them more likely, less likely, or equally likely to attend their assigned venue (Table 2-6). Across all venue types, the installation of CCTV cameras, traffic barriers, and uniformed security personnel were far more likely to lead to *increased* willingness to attend, rather than decreased willingness. A generalized estimation equation was used to predict whether respondents' indication of *increased* willingness to attend depended on venue or countermeasure, and suggested significant main effects for both ($ps<0.001$). Increased willingness to attend was greater for uniformed security personnel than either traffic barriers or CCTV cameras, and countermeasures had the greatest impact on increased willingness to attend convention center events and the least impact for shopping malls.

Table 2-6. Proportion of Respondents Indicating Increased or Decreased Likelihood of Attending Each Venue Following Implementation of Each Countermeasure

Countermeasure	Likelihood of Visiting	Shopping Mall	Stadium	Concert Hall	Convention Center
Additional CCTV cameras	More likely	19.9%	25.4%	29.2%	34.2%
	Less likely	3.3%	2.3%	3.5%	3.9%
Uniformed security personnel	More likely	29.6%	37.9%	42.4%	49.0%
	Less likely	2.4%	2.3%	6.0%	5.3%
Reconfigured traffic flows	More likely	15.5%	24.6%	33.2%	32.8%
	Less likely	6.0%	3.8%	6.0%	4.4%

Note: Table entries represent the proportion of respondents who would be "less likely" or "more likely" to attend each venue after countermeasure implementation. All other participants responded with "equally likely" (not shown in table).

11. Security Trade-offs with Cost and Delay

Through binary choices designed to elicit trade-offs among cost, inconvenience, and security, participants were asked about the prospect of increasing the venue's ability to detect patrons carrying weapons (detecting 10% of patrons carrying weapons versus detecting 50% of patrons carrying weapons), and the degree of security improvement that would be worth a fixed amount of money (e.g., increased entrance prices) and time (e.g., waiting in a security line).

Participants in the concert hall, convention center, and stadium conditions were asked whether increasing their venue's ability to detect weapon-carrying patrons from 10% to 50% was worth 1) an additional $10 in ticket cost, and 2) an additional 10 minutes waiting in a security line. Participants in the shopping mall condition were asked whether this increase in weapons detection was worth 1) paying an additional $1 for every $20 spent at the mall, and 2) walking an additional 5 minutes from the parking lot due to enhanced security measures (this

item was used instead of the security screening item due to the infrequency with which security screening is used at shopping malls). Participants could respond with "No," "Yes," or "Indifferent." "No" responses suggested that the security improvement was worth *less* than the proposed time/money cost, "Yes" responses suggested that the security improvement was worth *more* than the proposed time/money cost, and "Indifferent" responses suggested that the two were equivalent.

Security trade-offs with ticket price increases are displayed in Table 2-7 and with increased wait times in Table 2-8. Results suggest substantial inter-individual variability in the value placed on security measures, with no major differences in the value placed on security across the four venues. Respondents were generally far more willing to accept an additional 10-minute wait time for increases in security than they were to accept a $10 increase in ticket price, suggesting that countermeasures with time-related spillover effects may be perceived more favorably than countermeasures with monetary spillover effects. Interestingly, shopping mall respondents were less willing to spend an additional 5 minutes walking from the parking lot than the other venue respondents were willing to wait an additional 10 minutes in a security line. This may reflect either a difference in effort between these time costs or a lower threat expectation at shopping malls compared to other venues.

Table 2-7. Monetary Value of Improving Weapons Detection Sensitivity from 1/10 to 5/10

Monetary Value of Security Improvement	Shopping Mall (extra $1 per $20 spent)	Stadium ($10 per ticket)	Concert Hall ($10 per ticket)	Convention Center ($10 per ticket)
Less than $1 per $20 spent or $10 per ticket	32.5%	28.4%	22.2%	25.5%
Equal to $1 per $20 spent or $10 per ticket	23.8%	24.4%	31.7%	26.0%
More than $1 per $20 spent or $10 per ticket	43.7%	47.2%	46.1%	48.3%

Note: Monetary values for security improvement correspond to Yes/No/Indifferent responses to trade-off questions. Being willing to pay suggested the security improvement was worth more than the proposed amount, not being willing to pay suggested the security improvement was worth less than the proposed amount, and being indifferent suggested the security improvement was equally valuable as the proposed amount. Columns may not sum to 100% due to rounding.

Table 2-8. Time Value of Improving Sensitivity from 1/10 to 5/10 in Venue Weapons Detection

Time Value of Security Improvement	Shopping Mall (extra 5 minutes walking from parking lot)	Stadium (10 minutes in security line)	Concert Hall (10 minutes in security line)	Convention Center (10 minutes in security line)
Less than 5 minutes walking or 10 minutes waiting	24.1%	12.6%	8.7%	7.8%
Equal to 5 minutes walking or 10 minutes waiting	17.9%	15.3%	19.2%	18.4%
More than 5 minutes walking or 10 minutes waiting	58.1%	72.1%	71.8%	73.5%

Note: Time values for security improvement correspond to Yes/No/Indifferent responses to trade-off questions. Being willing to walk/wait suggested the security improvement was worth more than the proposed amount of time, not being willing to walk/wait suggested the security improvement was worth less than the proposed amount of time, and being indifferent suggested the security improvement was equally valuable as the proposed amount of time. Columns may not sum to 100% due to rounding.

12. Relationships Among Efficacy, Privacy Invasion, and Venue Enjoyment

To investigate how various attitudes toward the countermeasures related to each other, correlations were computed between respondents' ratings of each countermeasure's impact on feelings of 1) safety, 2) privacy, and 3) enjoyment of venue experience. Higher scores on these items respectively suggest 1) greater feelings of safety for each countermeasure, 2) more positive attitudes towards countermeasures' privacy intrusion, and 3) more positive attitudes towards the countermeasures' effect on venue enjoyment. These ratings come from respondents' self-reported negative attitudes towards security measures (see section 9 of this chapter; items for privacy and enjoyment were reverse-coded), as well as an additional item which asked respondents the degree to which they felt safe because of a given countermeasure at their assigned venue ('1'=Strongly disagree/no feelings of safety, '5'=Strongly agree/strong feelings of safety). Correlations appear in Table 2-9.

Generally, the less a countermeasure was perceived as an invasion of privacy, the less participants saw it as detracting from their enjoyment of the venue, as suggested by the positive correlations between privacy and enjoyment attitudes. Positive attitudes towards countermeasures' intrusiveness and impact on venue experience/enjoyment were moderately predictive of higher safety ratings for the countermeasures, suggesting that people's attitudes towards countermeasures are related to how effective they perceive them to be. The greater

Table 2-9. Correlations Between Countermeasures' Perceived Impact on Safety, Venue Enjoyment, and Privacy

		Shopping Malls	Stadiums	Concert Halls	Convention Centers
Safety & privacy attitudes	CCTV	0.29	0.31	0.16	0.01
	Uniformed security	0.31	0.43	0.34	0.27
	Undercover security	0.27	0.39	0.29	0.19
	Traffic barriers	N/A	N/A	N/A	N/A
Safety & venue enjoyment attitudes	CCTV	0.15	0.24	0.01	0.09
	Uniformed security	0.28	0.39	0.35	0.29
	Undercover security	0.19	0.37	0.23	0.17
	Traffic barriers	0.18	0.22	0.25	0.21
Privacy & venue enjoyment attitudes	CCTV	0.61	0.71	0.68	0.66
	Uniformed security	0.74	0.72	0.78	0.82
	Undercover security	0.80	0.76	0.81	0.80
	Traffic barriers	N/A	N/A	N/A	N/A

Note: Items are coded such that higher scores indicate positive attitudes (greater feelings of safety, greater enjoyment of venue, less invasion of privacy).

safety afforded by countermeasures appears to lead to greater enjoyment of the experience and an acceptance of any minor inconvenience, delay, or privacy invasion.

13. Predicting Willingness to Patronize Venues from Perceptions of Countermeasures

Logistic regression models were constructed to predict whether individuals would be *more* likely to attend their assigned venue after the installation of CCTV, uniformed security, and reconfigured traffic flows, based on participants' ratings of the countermeasure's inconvenience, effect on venue experience/enjoyment, invasion of privacy, and effect on feelings of safety (the same item analyzed in Section 9 of this chapter). Modeling the data in this way demonstrates which of the perceived countermeasure characteristics are most strongly predictive of a positive impact on venue attendance. Each of the four predictor variables were positively coded, such that higher scores indicate: 1) greater feelings of safety due to countermeasure, 2) more enjoyable venue experience in presence of countermeasure, 3) lower perceptions of countermeasure inconvenience, and 4) lower perceptions of privacy invasion, and. Table 2-10 presents the odds ratios (for the odds of being *more* willing to attend a venue) associated with a one-point increase in the Likert scale response for each predictor variable (1= 'Strongly disagree', 5= 'Strongly agree').

Increased willingness to attend a venue with a certain countermeasure in place was strongly related to an individual's feeling of safety associated with that countermeasure. Interestingly, although some participants held negative attitudes towards countermeasures'

invasiveness or effects on their enjoyment of the venue, these attitudes did not reliably predict intended attendance behavior. There was one significant *negative* relationship between venue attendance and enjoyment for CCTV surveillance in the concert hall survey, suggesting that concert patrons may be more sensitive to CCTV countermeasures than customers of the other

Table 2-10. Odds Ratios for Attending a Venue with a Given Countermeasure in Place, Based on Perceived Countermeasure Characteristics (*: $p<0.05$)

		Shopping Malls	Stadiums	Concert Halls	Convention Centers
Greater feelings of safety	CCTV	4.57*	4.13*	4.26*	3.74*
	Uniformed security	4.35*	3.19*	4.13*	3.49*
	Traffic barriers	3.35*	3.42*	2.46*	3.25*
More enjoyable experience	CCTV	0.76	0.76	0.61*	0.79
	Uniformed security	1.02	1.05	1.13	0.82
	Traffic barriers	1.04	0.90	0.91	0.90
Lower perception of inconvenience	CCTV	N/A	N/A	N/A	N/A
	Uniformed security	1.21	0.97	1.17	1.42*
	Traffic barriers	0.97	1.16	0.98	1.03
Lower perception of privacy invasion	CCTV	1.16	1.36	1.37*	1.16
	Uniformed security	0.67	1.12	0.77	0.82
	Traffic barriers	N/A	N/A	N/A	N/A

Note: Table entries represent the odds ratio (for the odds of a participant being "more likely" to attend after countermeasure implementation) associated with a one-point increase in the Likert scale response for the predictor variables. Ratios above 1.0 suggest a positive relationship between the predictor and being "more likely" to attend each venue; ratios below 1.0 suggest negative relationships.

three venue types. The main finding is that venue patronage seems to be largely driven by perceptions of enhanced safety associated with the countermeasure, and that the countermeasure's impact on the enjoyment of the venue, convenience, and privacy have little or no value in predicting intended attendance.

14. Discussion and Summary of Reference Survey Results

Across venue types, respondents generally believed that the assessed countermeasures (e.g., CCTV surveillance, security personnel, traffic barriers) improved safety, especially regarding their ability to reduce crime. Participants were also much more likely to *increase* rather than *decrease* their attendance at venues that employed these security measures. Distinctions did emerge in the perceived effectiveness of different countermeasures; for instance, CCTV surveillance was perceived as more capable of identifying adversaries *after* a

crime rather than *before,* while the opposite was true of manned security personnel. Yet participants expressed overall approving attitudes towards the effectiveness of the assessed measures.

This finding is corroborated by the general lack of strong negative attitudes towards each security technique. When asked whether each countermeasure constituted an invasion of privacy or made venue visits less enjoyable or convenient, all scale means were below the midpoint, suggesting overall disagreement with these propositions. Furthermore, logistic regression analyses suggested that perceived countermeasure safety, rather than attitudes regarding its invasiveness or effect on venue experience, was strongly predictive of an individual's willingness to patronize a venue. This result indicates that participants generally place value on venue security, and the money/time value trade-offs employed here suggest that many may even be willing to experience certain inconveniences for the sake of improved safety.

It should be noted that respondents' willingness to increase, rather than decrease, their attendance at venues that employ these countermeasures was not tied to a specific quantity or degree of countermeasure implementation. Thus, these results do not suggest a specific attendance increase that would correspond to a specific number of CCTV cameras, security guards, or traffic barriers. Any implementation of these countermeasures may result in positive impacts on venue attendance, but the effects would likely decrease in magnitude with each successive improvement or addition. Still, the results regarding patrons' willingness to attend after countermeasure implementation suggests positive spillover effects for enhanced security countermeasures.

These data suggest that the use of countermeasure at large venues may not result in any serious disruption of attendance. It is likely that many individuals' attendance decisions will be unaffected by the installation of specific countermeasures, and that any patrons driven away by such techniques may be replaced by an even larger share of customers who would be *more* willing to patronize venues with enhanced security. While these results are not firmly indicative of customer behavior at any one specific venue, they do suggest that the public values security, perceives the assessed countermeasures as relatively non-intrusive, and would not drastically alter attendance behavior following their implementation.

Chapter 3. Formulation and Description of the Venue-Specific Surveys

Richard John and Katie Byrd, Leads

1. Introduction

The purpose of this series of surveys was to measure customer perceptions of specific security measures currently employed at three public assembly venues, and to anticipate whether the implementation of certain terrorism countermeasures might cause spillover effects on business. The goal of these surveys was to target the customer base of three specific venues and determine the extent to which use of the countermeasures currently in place might affect attendance or patronage at each of the various venue types. The methodology used for the venue-specific surveys is comparable to that previously developed by the CREATE research team and used in the reference surveys described in Chapter 2.

2. Venues and Countermeasures

This study assessed knowledge, beliefs, attitudes, and behavioral intentions related to several public assembly countermeasures in three specific venues in urban areas: 1) a convention center (CC), (2) a sports stadium (Stadium), and (3) a sports arena (Arena). The convention center hosts a diverse array of several hundred events each year. The other two venues host concerts and professional sporting events, including Major League Baseball (MLB) (Stadium) and both the National Hockey League (NHL) and National Basketball Association (NBA) (Arena). These venues were selected from a list of such venues developed in consultation with DHS and BENS staff. Representatives at each venue were contacted in 2018 to solicit their participation in the study. Venues were selected based on the following criteria: 1) expressed willingness to participate in the study, 2) diversity in type of venue, and 3) diversity in venue location by region. The three venues selected represent quite different public assembly venue types, located in regionally diverse locations in the U.S.

It is important to note that a convention center is fundamentally different from other venue types in how countermeasures are deployed. MLB, NHL, and NBA venues consistently use the same countermeasures and security for all games (until there is a change, usually at the start of a new season); moreover, the security requirements for each league are standardized across all teams and venues. There is a uniformity and consistency for each of the three leagues that is mandated by the leagues and by the venue owners, who may elect even greater utilization of countermeasures than that mandated by the leagues.

In contrast, security for events at the CC venue for this study is the responsibility of each organization hosting an event to decide which countermeasures to employ and to provide the security. This CC does have security requirements, depending in part on the type and size of event, but the individual organizations have discretion over the level of security provided, particularly with respect to the countermeasures we are studying. The CC does not sell tickets;

rather, the convention center's revenue is based on renting out floor space to organizations, who then charge attendees a registration fee or ticket fee.

Extensive structured interviews were conducted in late 2019 with management personnel at each venue to learn more about currently employed security procedures and technology and their history of implementation. For each venue, we identified and scheduled phone interviews with key management personnel responsible for operations, marketing, and security. We identified four security measures currently used at all three venues:

1. Closed-circuit television (CCTV) cameras
2. Uniformed and undercover security patrols (with dogs)
3. Metal detectors at entry checkpoints
4. Bag inspection at entry checkpoints

Interviews with management personnel revealed increasingly extensive use of these four countermeasures at all three venues.

3. Survey Format

Each reference survey included various categories of questions aimed at understanding customers' awareness of the four security measures identified in Section 2 of this chapter, their attitudes towards their effectiveness, and the potential impact of such security measures on customer behavior and attendance. The items included in each survey can broadly be categorized under the following topics:

- *Awareness of Countermeasures*: Customers were asked to indicate whether they had heard of or experienced the various security measures at the specific named venue.
- *Perceived Effectiveness of Countermeasures:* Participants were asked to rate specific measures in terms of whether they made venues safer and how they did so (e.g., deterrence, improved ability to apprehend criminals, etc.).
- *Negative Attitudes Towards Countermeasures:* Participants also assessed whether specific countermeasures had negative effects on their venue experience, such as whether they believed certain countermeasures invaded their privacy.
- *Countermeasures and Attendance Behaviors:* Customers also assessed how the implementation of such countermeasures would affect their intention to patronize a venue.
- *Current Vulnerability of the Venue:* Customers were asked to consider the next 20 criminal (terrorist) attempts and estimate the number that would be successful from the perspective of the criminal (terrorist).
- *Value Placed on Security:* Lastly, customers responded to a series of nine binary willingness to pay (WTP) questions. Each question involved a specific cost (appropriate for the venue) and a specific decrease in risk (10%, 50%, 90%). For each survey, customers were randomly assigned to one of 16 different WTP contexts, defined by all

combinations of 1) source of risk reduced (crime vs. terrorism), 2) privacy impact (none vs. some additional invasion of privacy), and 3) additional delay required (none, 5 min, 10 min, 15 min).

A generic copy of the survey used for all three venues appears in Appendix 3A.

4. Customer Sampling

Data were collected in three separate surveys, each targeting customers and potential customers at each venue. All data were collected using a Qualtrics Panel, a widely accepted source of online participants for behavioral research. Respondents in all three surveys were compensated for their participation. In all surveys, respondents were eliminated for failing any one of four quality check questions.

Respondents for each survey were screened to exclude those who in the recent past (approximately three years) had never attended an event at the venue, had never considered attending an event at the venue, and had no intention of possibly attending an event at the venue in the future. We specifically included those who had never attended an event at the venue, but who had considered attending an event at the venue in the past or would consider attending an event at the venue in the near future. This inclusion criteria allowed us to include those who potentially had chosen not to attend an event at the venue for whatever reason, including reasons related to the use of security measures. The inclusion criteria mitigate the problem of underestimating concerns about security due to selection bias resulting from sampling only customers who are willing to attend the venue with the current security measures in place.

A quota sample of a little over 400 adult respondents was obtained for each venue, stratified by sex and age jointly. This stratification was used to obtain adequate representation of customers by age and sex and not to match the customer base for each venue, which was not available. For each survey, we obtained approximately equal size groups of men and women in each of six age categories: 18-25, 26-35, 36-45, 46-55, 56-65, and over 65 years of age. Table 3-1 summarizes demographic characteristics for all three samples in terms of sex, age, education, race, and income. While the three samples are comparable, there are some differences in education and race. The convention center sample appears to be somewhat better educated and somewhat more racially diverse than either the arena or stadium samples. These differences could be due to either demographic differences attributable to venue location or differences in the customer bases related to the events hosted at the venues. These differences are to some extent also dependent on our sample stratification by age and sex.

Table 3-1. Demographic Characteristics for Each Venue Survey

		CC	Arena	Stadium	Total
N		429	430	417	1,276
Sex	Male	44.1%	50.0%	48.4%	47.5%
	Female	55.9%	50.0%	51.6%	52.5%
Age in Years	18-24	16.6%	17.2%	14.6%	16.1%
	25-34	16.6%	16.5%	17.0%	16.7%
	35-44	16.6%	16.5%	17.0%	16.7%
	45-54	16.6%	16.5%	17.0%	16.7%
	55-64	16.6%	16.5%	17.0%	16.7%
	65 +	16.6%	16.5%	17.0%	16.7%
Highest Level of Education	Less than HS	0.9%	2.1%	1.2%	1.4%
	HS Graduate	8.9%	19.1%	16.6%	14.8%
	Some College	25.9%	29.1%	23.3%	26.1%
	Associate Degree	8.4%	13.5%	9.8%	10.6%
	Bachelor's Degree	37.1%	25.1%	32.4%	31.5%
	Graduate Degree	18.9%	11.2%	16.8%	15.6%
Race	White	60.8%	76.3%	83.9%	73.6%
	Asian	14.2%	3.7%	2.4%	6.8%
	Black/African American	6.1%	16.0%	3.6%	8.6%
	Hispanic or Latino	15.2%	2.3%	7.2%	8.2%
	American Indian or Alaska Native or Pacific Islander	0.9%	0.7%	0.7%	0.8%
	Other & Multiple Races	2.8%	0.9%	2.2%	2.0%
Income	Below $20,000	7.7%	12.0%	11.9%	10.5%
	$20,000 - $39,999	18.4%	24.0%	20.9%	21.1%
	$40,000 - $59,999	15.6%	18.8%	15.1%	16.5%
	$60,000 - $79,999	17.5%	13.0%	17.5%	16.0%
	$80,000 -$99,999	9.6%	9.3%	8.9%	9.3%
	$100,000 - $149,999	16.8%	17.0%	18.2%	17.3%
	$150,000 and above	14.5%	6.0%	8.2%	9.6%

Note: Percentages may add to less than 100% due to non-responses to demographic items.

5. Convention Center Customers

Table 3-2 summarizes the attendance patterns, typical cost to attend, and typical wait-time to enter the convention center venue for the sample of 429 customers. Approximately two-thirds (N=285) had attended an event at the convention center prior to 2016, and nearly one-half (N=205) had attended an event in 2016 or later. Slightly over half of actual customers at any time (N=332) had attended a free event at the convention center, and about 80% of actual customers had attended a paid event.

Recent customers (N=205), compared to past only or potential customers (N=224), include a higher percentage of males (48.3% vs. 40.2%) and a slightly higher percentage of whites (62.4% vs. 59.4%). Recent customers are somewhat younger (median age 35-44 vs. 45-54), better educated (62.0% vs. 50.4% with bachelors' degree), and have somewhat higher annual income.

Three-quarters of the actual customers (N=332) reported typical ticket prices of $50 or less, with one-third of actual customers reporting a typical ticket price of $21-$50. Over two-thirds of actual customers reported a typical wait-time of 10 minutes or less, with a third reporting a typical wait-time of 1-5 minutes. Only 8% of actual customers reported a typical wait-time of 30 minutes or longer.

Table 3-2. Convention Center Customer Attendance, Events Types, Typical Wait Times and Ticket Prices

2015 and Before N=429	Attended	66%	N=285	Free Event Paid Event Other	55% 81% 26%
	Considered	19%	N=82		
2016 and After N=429	Attended	48%	N=205	Free Event Paid Event Other	55% 78% 31%
	Considered	35%	N=150		
Typical Price Ever Attended N=332			Free ($0) $1-20 $21-50 $51-100 $101-250 $250+		15% 27% 33% 15% 8% 2%
Typical Wait Time Ever Attended N=332			No wait 1-5 min 6-10 min 11-19 min 20-29 min 30-39 min 40+ min		11% 33% 24% 17% 8% 5% 3%

6. Sports Arena Customers

Table 3-3 summarizes the attendance patterns, cost to attend, and wait-time to enter the sports arena venue for the sample of 430 customers. Approximately two-thirds (N=282) had attended an event at the sports arena in the past two-and-a-half years. About half of the actual customers attended either an NBA or NHL game, and nearly two-thirds of the actual customers attended a concert or other event: NBA (49%), NHL (54%), or concert or other (64%).

Recent customers (N=282) compared to past or potential customers (N=148) include a higher percentage of males (52.8% vs. 44.6%) and a slightly lower percentage of whites (73.8% vs. 81.1%). Recent customers are somewhat younger (median age 35-44 vs. 45-54), better educated (40.4% vs. 28.4% with bachelors' degree), and have somewhat higher annual income.

Three-quarters of actual customers (N=282) reported typical ticket prices of $100 or less, with one-third of actual customers reporting a typical ticket price of $21-$50. Over three-quarters of actual customers reported a typical wait-time of 10 minutes or less, with nearly half reporting a typical wait-time of 5 minutes or less. Less than 2% of actual customers reported a typical wait-time of 30 minutes or longer.

Table 3-3. Sports Arena Customer Attendance, Events Types, Typical Wait Times and Ticket Prices

2017 and After N=430	Attended	65.7%	N=282	NBA NHL Other	49% 54% 64%
	Considered	34.3%	N=148		
Typical Price Ever Attended N=282		Up to $20 $21-50 $51-100 $101-250 $250+		3% 33% 41% 20% 3%	
Typical Wait Time Ever Attended N=282		No wait 1-5 min 6-10 min 11-19 min 20-29 min 30-39 min 40+ min		6% 40% 31% 15% 6% 2% 0%	

7. Stadium Customers

Table 3-4 summarizes the attendance patterns, cost to attend, and wait-time to enter the stadium venue for the sample of 417 customers. Approximately three-quarters (N=318) attended an event at the stadium prior to 2016, and over 70% (N=298) had attended an event

in 2016 or later. Over 97% of actual customers (N=375) had attended an MLB game at the stadium, and nearly a third of actual customers had attended a concert or other event.

Recent customers (N=298) compared to past or potential customers (N=119) include a higher percentage of males (52.0% vs. 39.5%) and a slightly higher percentage of whites (85.2% vs. 80.7%). Recent customers are somewhat younger (median age 35-44 vs. 45-54), better educated (53.4% vs. 38.7% with bachelors' degree), and have somewhat higher annual income.

Just over seven in 10 actual customers reported typical ticket prices of $50 or less, with one in three actual customers reporting a typical ticket price of $21-$50. Nearly three out of every four actual customers reported a typical wait-time of 10 minutes or less, with nearly four in 10 reporting a typical wait time of less than 5 minutes. Only 3% of actual customers reported a typical wait-time of 30 minutes or longer.

Table 3-4. Stadium Customer Attendance, Events, Typical Wait-Times, and Ticket Prices

2015 and Before N=417	Attended	76%	N=318	(MLB) Other	98% 31%
	Considered	11%	N=44		
2016 and After N=417	Attended	71%	N=298	(MLB) Other	97% 32%
	Considered	22%	N=90		
Typical Price Ever Attended N=375		Up to $20 $21-50 $51-100 $101-250 $250+		13% 58% 23% 5% 1%	
Typical Wait Time Ever Attended N=375		No wait 1-5 min 6-10 min 11-19 min 20-29 min 30-39 min 40+ min		7% 32% 35% 16% 7% 2% 1%	

Chapter 4. Tabulation and Basic Analysis of the Specific Venue Surveys

Richard John and Katie Byrd, Leads

1. Introduction

Specific venue survey results are presented for each individual venue sample and for the total sample of N=1,276. We highlight results that are consistent across all three venues and note results that are unique to each of the individual venues. Overall, there are more similarities than differences in customer beliefs, attitudes, and behavioral intentions across venues. It is important to remember that the total sample is a diverse group of customers to events from three different premier-level professional sports leagues, concerts of all types, and a vast array of events hosted by different organizations who lease convention center space.

2. Customer Awareness of Increased Use of Countermeasures

Customers and potential customers indicated whether they had noticed or had heard about recent increases in security measures at the venue. Management personnel interviewed had indicated a steady increase in utilization of all four countermeasures over the recent past. Percentages of customers noticing or hearing about such increases are presented in Table 4-1 by venue and by countermeasure. Overall, a little over half of the customers indicated noticing or hearing about increases in deployment of any one of the four countermeasures. Across all venues, bag checks were most noticed (63%), followed by metal detectors (54%) and security patrols (53%), with CCTV the least noticed (51%). Awareness of increases in the use of countermeasures was roughly comparable across the three venues, although customers of the convention center and stadium were more likely to report awareness of increased use of countermeasures than arena customers.

Table 4-1. Percent of Customers Noticing or Hearing About Increases in Countermeasures

Countermeasure		CC N=429	Arena N=430	Stadium N=417	Total N=1,276
CCTV Cameras	Noticed	21%	14%	16%	17%
	Heard	24%	27%	21%	24%
Uniformed and Undercover Security	Noticed	29%	25%	31%	28%
	Heard	27%	25%	22%	25%
Metal Detectors	Noticed	33%	26%	37%	32%
	Heard	24%	24%	17%	22%
Bag Checks	Noticed	36%	33%	42%	37%
	Heard	27%	26%	24%	26%

3. Customer Perceived Effectiveness of Countermeasures

Customers and potential customers of all three venues rated each of the four countermeasures for effectiveness in reducing the risk of terrorism and the risk of crime, separately. Mean ratings using a 1 to 5 scale (5 is highly effective) are presented in Table 4-2. Security patrols, metal detectors, and bag checks are all believed to be quite effective, with mean ratings across all venues between 3.8 and 4.0. The passive countermeasure, CCTV, is seen as only slightly less effective, with overall means between 3.7 and 3.75. All four countermeasures are perceived as approximately equally effective in reducing risks from crime and terrorism, although metal detectors and bag checks are perceived as slightly more effective for terrorism, while CCTV and security patrols are perceived as more effective in reducing crime risk.

Customers also indicated their beliefs about whether each of the four countermeasures improves security and safety. For all countermeasures, customers indicated whether each countermeasure was effective in stopping the criminal or terrorist before the crime or attack. In addition, for CCTV and security patrols, customers indicated whether the countermeasure was effective in identifying and arresting the criminal or terrorist after the crime or attack. Results are summarized in Table 4-3. Across all three venues, about 90% of customers believe each of the countermeasures improves security and safety. Moreover, each of the four countermeasures is perceived as somewhat more effective for mitigating crime risk than for mitigating terrorism risk for all three venues..

Table 4-2. Means (SD) of Customers' Perceived Effectiveness of Countermeasures to Reduce Risk of Terrorism and Crime by Venue (1-5 scale)

Countermeasure	Threat	CC N=429	Arena N=430	Stadium N=417	Total N=1,276
CCTV cameras	Crime	3.81 (1.00)	3.80 (.92)	3.64 (.88)	3.75
	Terrorism	3.75 (1.02)	3.77 (1.03)	3.58 (1.05)	3.70
Security guards	Crime	3.98 (.97)	3.99 (.94)	3.87 (.91)	3.95
	Terrorism	3.90 (1.02)	3.91 (.95)	3.71 (1.04)	3.84
Metal detectors	Crime	3.89 (1.00)	3.96 (.98)	3.67 (1.00)	3.84
	Terrorism	4.02 (.97)	4.08 (.94)	3.88 (1.02)	3.99
Bag checks	Crime	3.84 (1.04)	3.87 (.97)	3.70 (1.03)	3.80
	Terrorism	4.01 (.98)	4.06 (.95)	3.89 (1.03)	3.99

Note: Values represent the degree to which respondents agreed that each countermeasure reduced crime and terrorism risk, on a 5-point Likert scale (1='Strongly disagree', 5='Strongly agree'). Table entries are means accompanied by standard deviations.

Table 4-3. Percent of Customers Endorsing Various Beliefs about Countermeasure Effectiveness

	CC N=429	Arena N=430	Stadium N=417	Total N=1,276
CCTV Cameras				
Improves security & safety	90%	93%	86%	90%
Easier to identify/arrest criminals AFTER crime	78%	70%	74%	74%
Easier to identify/arrest terrorists AFTER attack	63%	57%	60%	60%
Easier to stop criminals BEFORE crime	47%	49%	41%	46%
Easier to stop terrorists BEFORE attack	41%	47%	40%	43%
Security Guards				
Improves security & safety	91%	92%	91%	91%
Easier to identify/arrest criminals AFTER crime	51%	54%	53%	53%
Easier to identify/arrest terrorists AFTER attack	42%	39%	42%	41%
Easier to stop criminals BEFORE crime	69%	70%	66%	68%
Easier to stop terrorists BEFORE attack	58%	59%	54%	57%
Metal Detectors				
Improves security & safety	91%	94%	88%	91%
Easier to stop criminals BEFORE crime	81%	81%	74%	79%
Easier to stop terrorists BEFORE attack	69%	71%	71%	70%
Bag Checks				
Improves security & safety	88%	92%	85%	88%
Easier to stop criminals BEFORE crime	77%	80%	73%	77%
Easier to stop terrorists BEFORE attack	70%	71%	67%	69%

4. Customer Attitudes Toward Countermeasures

For each of the four countermeasures (CM), customers were asked to consider three statements: 1) CM makes me feel safer, 2) CM makes it less convenient to spend time at the venue, and 3) CM invades my privacy. For each of these three propositions, customers indicated either agreement or disagreement on a 1 to 5 scale, with 3 being neutral. Percentages of customers who agreed (4 or 5), were neutral (3), or disagreed (1 or 2) with each of the three statements for each countermeasure are presented in Table 4-4. Across all four countermeasures, customers agreed that the countermeasures make them feel safer (less than 7% disagreed that any countermeasure makes them feel safer). Customers did not believe the four countermeasures represent an inconvenience, although 17% agreed that bag checks make it less convenient to spend time at the venue. Finally, customers did not believe the countermeasures are invasive, although 25% agreed that bag checks invade their privacy, which was higher than the 17% agreeing that CCTV invades their privacy. Customer attitudes toward the countermeasures were highly consistent across the three venues.

Table 4-4. Percent of Customers Agreeing or Disagreeing about Whether Countermeasures Make Them Feel Safer, Are Inconvenient, or Represent an Invasion of Privacy

		CC N=429	Arena N=430	Stadium N=417	Total N=1,276
CCTV					
Makes me feel safer	Agree	72.3%	74.5%	65.6%	70.8%
	Neutral	22.1%	18.3%	26.1%	22.2%
	Disagree	5.4%	6.9%	8.1%	6.8%
Makes it less convenient to spend time at venue	Agree	12.5%	11.6%	12.2%	12.1%
	Neutral	19.5%	16.0%	21.1%	18.9%
	Disagree	67.7%	72.2%	66.5%	68.8%
Invade my privacy	Agree	16.3%	14.8%	18.7%	16.6%
	Neutral	23.7%	19.0%	21.5%	21.4%
	Disagree	59.7%	65.9%	59.6%	61.7%
Security Guards					
Makes me feel safer	Agree	77.9%	84.5%	77.3%	79.9%
	Neutral	16%	11.8%	18.2%	15.3%
	Disagree	5.9%	3.5%	4.3%	4.6%
Makes it less convenient to spend time at venue	Agree	14.9%	9.5%	9.1%	11.2%
	Neutral	17.7%	14.8%	18.9%	17.1%
	Disagree	67.2%	75.4%	71.7%	71.4%

		CC N=429	Arena N=430	Stadium N=417	Total N=1,276
Invade my privacy	Agree	9.1%	8.1%	7.9%	8.4%
	Neutral	17.2%	16.9%	17.7%	17.3%
	Disagree	73.5%	74.8%	74.2%	74.2%
Metal Detectors					
Makes me feel safer	Agree	79.6%	82.9%	73.7%	78.7%
	Neutral	15.6%	13.2%	20.6%	16.5%
	Disagree	4.7%	3.7%	5.5%	4.6%
Makes it less convenient to spend time here	Agree	13%	9.7%	10.8%	11.2%
	Neutral	18.4%	13.9%	19.9%	17.4%
	Disagree	68.4%	76.1%	69.2%	71.2%
Invade my privacy	Agree	12.3%	8.1%	11.2%	10.5%
	Neutral	15.1%	16.5%	18.4%	16.7%
	Disagree	72.3%	75.2%	70.1%	72.5%
Bag Checks					
Makes me feel safer	Agree	76.0%	78%	69.1%	74.4%
	Neutral	16.3%	17.9%	21.8%	18.7%
	Disagree	7.5%	4.0%	8.9%	6.8%
Makes it less convenient to spend time at venue	Agree	18.7%	14.2%	18.9%	17.3%
	Neutral	18.4%	17.9%	20.3%	18.9%
	Disagree	62.8%	67.7%	60.5%	63.7%
Invade my privacy	Agree	23.3%	24.8%	27.1%	25.1%
	Neutral	20.0%	17.2%	20.8%	19.3%
	Disagree	56.5%	57.8%	51.9%	55.4%

5. Customer Likelihood of Attending an Event Following Deployment of Countermeasures

Customers at all three venues indicated whether increased deployment of each of the four countermeasures would increase, decrease, or have no effect on their likelihood of attending events at the venue. Those who indicated a change in likelihood of attending were also asked the amount of increase or decrease as a percentage of their usual attendance frequency. The percent of respondents indicating an increase, decrease, or no change in likelihood of attending an event following deployment of each of the four countermeasures is presented for all three venues in Table 4-5.[1]

[1] Overall across all three venues, the % change in attendance values were smaller for respondents that did not attend any events compared to respondents that did attend at any time. Omitting these potential customers from

In addition, for those indicating a change in likelihood, the mean percentage change is also displayed. Across all three venues and all four countermeasures, between 70% and 75% of customers indicated that an increased countermeasure deployment would not change their likelihood of attending an event at the venue. Over all venues, very few customers indicated that their likelihood of attending would decrease with increased deployment of countermeasures, ranging from 0.5% for increased CCTV to 2.4% for increased bag checks at entry points. Approximately a quarter of venue customers indicated that increased countermeasure deployment would increase their likelihood of attending an event.

We also compared recent customers with previous customers and potential customers at each of the three venues. Recent convention center customers attending events during the past four years, compared to previous and potential customers, reported a greater likelihood of attending future events, ranging from about a 7% difference for CCTV enhancements to an 11-12% increase for the other three countermeasures. A similar result was observed for the stadium; recent stadium customers who attended MLB games over the past four years, compared to previous and potential customers, reported a greater likelihood of attending future events, ranging between 5% and 8% for each of the countermeasure enhancements. These differences are consistent for both the convention center and the stadium and across all four proposed countermeasure enhancements.

A different pattern emerged for the arena comparison of recent customers who attended an NHL or NBA game over the past two and a half years and potential customers (there were no past customers sampled). Potential customers indicated a greater increase in likelihood of attending than recent customers for three of the countermeasures: CCTV (6.1%), law enforcement (4.5%), and bag checks (1.6%), while recent customers indicated a greater increase in attending future events for metal detector enhancements (2.7%). These differences involving potential customers who had not attended an event at the arena are small, and responses by the potential customers are based on no direct experience with the arena countermeasures.

Across all three venues and four countermeasures, less than four percent of recent customers, past customers/potential customers indicated they would attend fewer future events following countermeasure enhancement.

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all venues increases the overall estimates of % increase in future attendance for those who indicated that increase use of countermeasures would increase the likelihood of attending an event at the venue.

The Convention Center attendance increase is much higher after removing customers who have not attended in the past four years. There is a substantial difference in the percentage customers who indicated their likelihood of attending would change depending on how recently they attended an event. Customers who **have not** attended since 2016 reported were much less likely to increase attendance following deployment of countermeasures compared to those who **have** attended within the past four years.

Table 4-5. Percent of Customers Indicating Increased or Decreased Likelihood of Attending Each Venue after Implementation of Each Countermeasure

Countermeasure	Likelihood of visiting	CC N=429		Arena N=430	
Additional CCTV cameras	More likely:	26.0% (N=112)		25.1% (N=108)	
	> 100% increase	8.4% (N=36)	M= 308.1	5.3% (N=23)	M= 310.6
	≤ 100% increase	17.7% (N=76)	M= 66.0	19.7% (N=85)	M= 65.8
	Less likely	1.2% (N=5)	M= -67.2	0.7% (N=3)	M= -40.3
	No change	72.6% (N= 312)		74.0% (N=319)	
Additional security guards	More likely:	32.8% (N=141)		28.8% (N=124)	
	> 100% increase	7.7% (N=33)	M=332.6	8.6% (N=37)	M= 311.4
	≤ 100% increase	25.2% (N=108)	M= 61.6	20.2% (N=87)	M= 64.3
	Less likely	0.9% (N=4)	M= -59.3	0.5% (N=2)	M= -51.0
	No change	66.0% (N= 284)		70.5% (N=304)	
Metal detectors	More likely:	30.2% (N=130)		26.7% (N=115)	
	> 100% increase	9.5% (N=41)	M= 319.9	5.8% (N=25)	M=327.7
	≤ 100% increase	20.7% (N=89)	M= 65.3	20.9% (N=90)	M= 65.8
	Less likely	2.6% (N=11)	M= -44.9	0.7% (N=3)	M= -8.0
	No change	67.0% (N= 288)		72.4% (N=312)	
Bag checks	More likely:	27.2% (N=117)		23.9% (N=103)	
	> 100% increase	10.0% (N=43)	M= 312.2	5.3% (N=23)	M= 342.5
	≤ 100% increase	17.2% (N=74)	M= 64.9	18.6% (N=80)	M= 66.9
	Less likely	2.6% (N=11)	M= -56.0	1.2% (N=5)	M= -41.4
	No change	70.0% (N= 301)		74.7% (N=322)	

Note: M designates the mean percent change in likelihood of attending.

Countermeasure	Likelihood of visiting	Stadium N=417		Total N=1,276	
Additional CCTV cameras	More likely:	18.9% (N=79)		23.4% (N= 299)	
	> 100% increase	4.5% (N=19)	M= 288.6	6.1% (N= 78)	M= 304.1
	≤ 100% increase	14.4% (N=60)	M= 68.8	17.3% (N= 221)	M= 66.7
	Less likely	1.9% (N=8)	M= -69.9	1.3% (N= 16)	M= -63.5
	No change	78.9% (N= 330)		75.1% (N= 961)	
Additional security guards	More likely:	22.5% (N=94)		28.1% (N= 359)	
	> 100% increase	5.5% (N=23)	M= 314.2	7.3% (N= 93)	M= 319.6
	≤ 100% increase	17.0% (N= 71)	M= 62.8	20.8% (N= 266)	M= 62.8
	Less likely	1.2% (N= 5)	M= -73.6	0.9% (N= 11)	M=-64.3
	No change	76.1% (N= 318)		70.8% (N= 906)	

Metal detectors	More likely: > 100% increase ≤ 100% increase Less likely No change	18.4% (N= 77) 5.5% (N= 23) 12.9% (N= 54) 1.9% (N= 8) 79.4% (N= 332)	 M= 311.2 M= 69.8 M= -54.3	25.2% (N= 322) 7.0% (N= 89) 18.2% (N= 233) 1.7% (N= 22) 72.9% (N= 932)	 M= 319.8 M=66.5 M=-43.3
Bag checks	More likely: > 100% increase ≤ 100% increase Less likely No change	18.2% (N= 76) 4.3% (N= 18) 13.9% (N= 58) 3.6% (N= 15) 78.0% (N= 326)	 M= 371.2 M=68.4 M=-38.9	23.1% (N= 296) 6.6% (N= 84) 16.6% (N= 212) 2.4% (N= 31) 74.2% (N= 949)	 M= 333.1 M= 66.6 M= -45.4

Note: M designates the mean percent change in likelihood of attending.

6. Customer Perception of Venue Vulnerability

Customers were asked about the vulnerability of the venue to crime and terror, separately. Specifically, customers were asked to imagine the next 20 attempted crimes (terror attacks), and to estimate how many of these attempts would be successful from the perspective of the criminal (terrorist). Table 4-6 presents mean estimated successes out of 20 attempts by venue and by crime vs. terror. Means for crime successes indicate that customers' mean perceived vulnerability for crime is about 35%, ranging between 30% and 40% across the three venues. Customers' perceived terror vulnerability was lower, ranging between 25% and 30%.

Table 4-6. Mean Number of Success for an Act of Terrorism or Crime out of 20 Attempts Given the Current Countermeasures

	CC N = 429	Arena N = 430	Stadium N= 417	Total
Terror	5.9 (6.4)	5.2 (5.8)	5.4 (6.0)	5.5 (6.0)
Crime	7.4 (6.1)	6.6 (5.9)	7.4 (5.9)	7.1 (6.0)

Note: Values are on a range from 0 to 20, with 0 being no successful attempts and 20 being 20 successful attempts out of 20 attempts. Table entries are means, accompanied by standard deviations in parentheses.

7. Customer Willingness to Pay (WTP) for Decreased Risk of Crime and Terrorism

Customers were asked to consider (sequentially) nine separate binary choices that required a trade-off between increased ticket price and decreased risk of either crime or terrorism. Table 4-7 presents the percentage of customers willing to pay the increase in ticket price to reduce the risk for the nine combinations of price increase ($1, $3, $5) and risk reduction (10%, 50%, and 90%). The percentages in Table 4-7 are collapsed across type of risk reduction (terror vs. crime), increased invasion of privacy (some vs. none), and increase in wait time (none, 5 min, 10 min, 15 min). While 76% customers are willing to pay an extra dollar for a reduction in risk, only 42% are willing to pay an extra $5 for some reduction in risk. The amount of risk reduction does not have much effect on WTP, with 55% willing to pay something to reduce risk by 10%, but only 64% willing to pay something to reduce risk by 90%. Overall, WTP is consistent across the three venues.

Table 4-7. Willingness to Pay (WTP) Percentages by Price Increase and Risk Reduction

CC		Risk Reduction			
Price Increase		10%	50%	90%	Total
N=429	$1	71.9%	75.3%	80.9%	76.0%
	$3	52.6%	58.1%	66.3%	59.0%
	$5	36.3%	40.9%	49.3%	42.2%
	Total	53.6%	58.1%	65.5%	59.1%

Arena		Risk Reduction			
Price Increase		10%	50%	90%	Total
N=430	$1	72.4%	76.3%	81.2%	76.6%
	$3	57.8%	58.3%	63.8%	60.0%
	$5	42.2%	40.6%	47.1%	43.3%
	Total	57.5%	58.4%	64.0%	60.0%

Stadium		Risk Reduction			
Price Increase		10%	50%	90%	Total
N=417	$1	71.5%	76.1%	80.4%	76.0%
	$3	49.3%	54.5%	60.3%	54.7%
	$5	36.4%	39.2%	47.4%	41.0%
	Total	52.4%	56.6%	62.7%	57.2%

Total		Risk Reduction			
Price Increase		10%	50%	90%	Total
N=1,276	$1	71.9%	75.9%	80.8%	76.2%
	$3	53.2%	57.0%	63.5%	57.9%
	$5	38.3%	40.3%	47.9%	42.2%
	Total	54.5%	57.7%	64.1%	58.8%

We also compared customers' WTP for terror vs. crime risk reduction, invasion of privacy vs. no invasion of privacy, and increases in wait time associated with the risk reduction (0, 5, 10, 15 min). Table 4-8 presents the percentage of customers willing to pay something, disaggregated by these three factors and collapsed across increased cost amount ($1, $3, $5) and percentage of risk reduction (10%, 50%, 90%). Increase in wait time has a small effect on WTP, ranging from 61% willing to pay with no increase in wait time to 56% willing to pay with a 15-minute increase in wait time. Both invasion of privacy and source of risk reduction (crime vs. terror) have negligible impacts on WTP, with a difference of only 1.4% in WTP for privacy invasion vs. no privacy invasion, and a difference of only 0.2% in WTP for crime vs. terror. WTP was generally consistent across the three venues.

Table 4-8. Percent Willing to Pay for Risk Reduction by Wait Times, Threat Type, and Privacy Invasion

CC	Terror N=215	Crime N=214	Additional Privacy Invasion N=215	No Additional Privacy Invasion N=214	Total N=429
No wait N=107	63.2%	58.0%	59.3%	61.9%	60.6%
5 min N= 108	58.0%	61.1%	63.6%	61.7%	61.1%
10 min N=107	54.9%	60.5%	57.8%	57.6%	57.7%
15 min N=107	53.3%	55.1%	58.6	49.8%	54.2%
Total N=429	57.4%	58.7%	59.8%	57.8%	58.4%

Arena	Terror N=215	Crime N=215	Additional Privacy Invasion N=215	No Additional Privacy Invasion N=215	Total N=430
No wait N=108	66.0%	60.0%	63.8%	62.1%	63.0%
5 min N= 108	55.0%	56.6%	64.4%	47.1%	55.8%
10 min N=107	63.8%	62.3%	60.1%	66.0%	63.1%
15 min N=107	53.1%	61.9%	56.0%	59.1%	57.5%
Total N=430	59.5%	60.2%	61.1%	58.6%	59.8%

Stadium	Terror N=211	Crime N= 206	Additional Privacy Invasion N=210	No Additional Privacy Invasion N=207	Total N=417
No wait N=103	63.9%	56.2%	57.9%	62.5%	60.1%
5 min N= 105	54.7%	55.8%	47.4%	62.9%	55.2%
10 min N=104	56.2%	60.8%	66.7%	49.9%	58.4%
15 min N=105	59.5%	51.7%	56.6%	54.7%	55.6%
Total N=417	58.6%	56.1%	57.2%	57.5%	57.3%

TOTAL	Terror N=641	Crime N= 635	Additional Privacy Invasion N= 640	No Additional Privacy Invasion N= 636	Total N=1,276
No wait N= 318	64.4%	58.1%	60.3%	62.2%	61.2%
5 min N= 321	55.9%	57.8%	58.5%	57.2%	57.4%
10 min N= 318	58.3%	61.2%	61.5%	57.8%	59.7%
15 min N= 319	55.3%	56.2%	57.1%	54.5%	55.8%
Total N= 1276	58.5%	58.3%	59.4%	58.0%	58.5%

8. Venue Management Structured Interview

We administered a structured interview to three management personnel at each venue. Interviewees representing operations, marketing, and security were identified and recruited through our primary contact at each venue. Each interview was conducted by phone and lasted approximately one hour. The primary purpose of these interviews was to gather current

information on the security measures utilized at each venue, including their recent history of deployment. In addition, we gathered information on management's beliefs about customers' perceptions of the terrorism countermeasures in use, including their experience with customer comments, pro or con. The interview included questions related to management's knowledge of the following:

1. Customer complaints about increases in various countermeasures
2. Effectiveness of various countermeasures
3. Impacts of various countermeasures on attendance at the venue
4. Consideration of discounts to compensate for inconvenience or invasion of privacy of various countermeasures
5. History of recent changes in deployment of various countermeasures
6. Rationale for management decisions to increase deployment of various countermeasures
7. Impact of increase in utilization of various countermeasures on venue sales revenues
8. Approximate change in sales revenues due to increased deployment of various countermeasures
9. Methods used to inform customers of various countermeasures utilized

A copy of the Structured Interview used is provided in Appendix 4A.

Our findings from the nine total structured interview sessions are summarized below.

1. Management for the Stadium and Arena acknowledged relatively isolated complaints about countermeasures, particularly when a new countermeasure, such as bag checks, is deployed or modified. Management reported considerably more compliments on enhanced security than complaints about security.
2. Convention Center management indicated that countermeasures vary considerably as a function of the event hosted. The CC provides some countermeasures, while others are provided by the organization hosting an event. Rules and guidelines for required security measures are established by the CC and communicated to the organizations hosting events.
3. Overall, management believes the countermeasures are extremely effective in deterring and reducing vulnerability of the venue to both terrorism and crime.
4. Management for the Stadium and Arena believe that attendance is not greatly impacted by recent deployments of countermeasures. If there is any impact, management believes it is likely a positive impact due to customers' increased feelings of safety.
5. Management for the CC noted that their customers are the organizations that lease the center, and not individual attendees. They do not believe increased security requirements for events has impacted either the number of events booked each year or their overall revenues, which are steadily increasing.

6. Management at all venues indicated no consideration of discounting ticket prices to offset perceptions of inconvenience or invasion of privacy from increased use of countermeasures.
7. Management for all venues indicated increasing deployment of security measures over the past several years and confirmed increased utilization of the four countermeasures targeted in the customer surveys. There was also an indication that many recent deployments of security measures were intended to increase customer convenience, while maintaining the same level of overall security, e.g., increased number of checkpoints with metal detectors.
8. Management for the Stadium and Arena indicated that many of the changes that increased security were in response to requirements and guidelines issued by professional sports leagues (MLB, NBA, NHL). Management at all venues indicated the influence of national organizations of venue operators regarding best practices for security. In addition, management also indicated that, in some cases, increased security implementation was the result of recent terror shooting attacks elsewhere. There were no reports of incidents at these venues themselves that led to increased utilization of countermeasures.
9. Management does not believe that terrorism countermeasures have any substantial impact on sales revenues.
10. Management at all venues indicated information about security is available on their website. In addition, both arena and stadium management indicated an aggressive communication of security requirements across multiple mediums to customers in order to minimize wait-times at the entry points. CC management indicated that organizations hosting events communicate their event-specific security requirements to their attendees.

9. Conclusion

Results of the specific venue surveys support the following eight conclusions:

1. Beliefs, attitudes, and intentions to attend events employing security measures are consistent across the three venues, representing quite different venue types hosting markedly different events in different regions of the U.S. Homogeneity across venues is consistent with findings from the reference survey (reported in Chapter 2) and suggests that our findings are generalizable across a broad range of public assembly venues in the U.S.
2. Although deployment of countermeasures has increased over the past several years at all three venues, only one-quarter to one-third of all customers noticed or were aware of the increased use of countermeasures.
3. On average, customers view the four countermeasures as all moderately effective (about 4 on a 1-5 scale) in reducing the risk of both crime and terrorism.

4. An overwhelming majority of customers (nine out of ten) believe that the four countermeasures improve security at the venue. The countermeasures are perceived as somewhat more effective in reducing crime risk than reducing the risk of terrorism.
5. A large majority of customers believe they are safer when they attend the venue because of the countermeasures and do not view them as either an inconvenience or an invasion of privacy. Of the four countermeasures, bag checks are viewed as the most inconvenient and the most invasive of privacy.
6. Deployment of additional security measures does not affect intentions to attend events at the three venues for a large majority (two-thirds to three-quarters) of the customers. For about one-quarter of customers, enhanced countermeasures would increase their likelihood of attending events. Only a small group, less than 3%, indicated a decreased likelihood of attendance associated with increased use of countermeasures.
7. There is substantial diversity in customers' willingness to pay for increased security. A substantial group of customers is unwilling to pay anything for quite large reductions in risks from crime and terrorism. The amount of risk reduction matters in customers' willingness to pay, but not as much as it should.
8. Customers' willingness to pay demonstrates a very slight sensitivity to inconvenience due to wait time increases. Willingness to pay is completely insensitivity to changes in privacy invasiveness and constant across whether reduction in risk is for crime or terrorism.

Chapter 5. Willingness to Pay for Additional Security – Risk Reduction and Spillover Effects

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1. Introduction

Changing security infrastructure and practices at venues could reduce the likelihood that an attack on the venue is successful or lower the likelihood that an attack takes place in the first place. Adding security has other impacts beyond these objectives. These secondary or spillover characteristics can have large impacts on the public and substantially influence preferences for security (Rose et al., 2014). In some instances, these effects will be positively correlated with security. Prager et al. (2015) found that adding security officers to airports results in substantial GDP benefits due to reduced wait times. Other interventions may carry side effects that result in disutility. Viscusi and Zeckhauser (2003) note the competing preferences between safety and civil liberties and equity.

Modifying security practices is not costless, however, and would require that either the venue lower their profits or customers pay greater costs (or some combination of the two). While it is easy to advocate for any possible security mechanism, security upgrades should not take place unless the benefits they generate exceed the additional costs. There are two important considerations for this cost-benefit analysis. First, the amount that people would actually be willing to pay to reduce risk depends on their assessment of the underlying risk, the value they place on their own well-being, and their risk aversion, which are all unknown. Second, the impacts other than risk reduction must be valued as well and counted towards the total benefits of a potential security intervention. These secondary impacts could conceivably be large enough to change the net result of the cost-benefit test if the negative value from the secondary effects exceeds the value that people place on reducing their exposure to risk.

This chapter analyzes the economic value that customers place on additional security measures and differentiates between the value from risk reduction and the value from secondary characteristics that are associated with the security measures. By isolating the characteristics related to security from those related to other characteristics like privacy and wait times, we provide an estimate that can be used for cost-benefit analysis that considers not only the direct benefits of reducing risk at venues but also the losses (or potential benefits) experienced from non-risk reduction attributes. Using discrete choice survey methodology, we elicit preferences for "bundles" of security alternatives (e.g., guards, security cameras) and identify the relative value that people place on the various attributes of each alternative. We consider the magnitude of risk reduction, changes in wait times, and potential invasion of privacy. We also note that preferences may vary based on the type of incident that security measures are intended to interdict, and we separately examine the willingness to pay for security interventions that protect against terrorism and those that protect against general (non-terrorism) crime.

2. Methodology

2.1. Overview of Stated Preference

The fundamental difficulty in measuring the value of security is that the benefits derived from enhanced security are typically non-market goods. This means that the goods cannot be purchased in normal markets by people who value them. For example, even if people value a reduction in the probability of a successful or attempted terrorist attack, there is no mechanism through which a person can purchase such improved changes.

The economic field of non-market valuation was developed to identify the amount that people would pay for goods and services that cannot be priced or sold like normal goods. One approach to non-market valuation is stated preference. Unlike revealed preference methods, in which the value of goods is learned by observing real world sales, stated preference relies on using surveys to ask people how much they would be willing to pay for the non-market good. These techniques were initially developed and implemented during the expert testimony to establish the value that Americans placed on the habitat losses due to the Exxon Valdez spill (Carson et al., 2003). While there is ongoing debate about the use of stated preference techniques for legal judgments, they are widely used to estimate the value of non-market goods, and best practices have been established for conducting these studies.

One specific type of stated preference technique is conjoint analysis. While basic stated preference approaches ask survey respondents specific questions about how much they would be willing to pay for a good (e.g., how much would you be willing to pay in extra fees for additional bag checks at events), conjoint analysis presents a set of options with varying attributes and asks survey respondents to select the option that they most prefer. For example, a survey respondent may be given the choice between an event with a cost of $50 that does not have bag checks and an event with a cost of $75 that does have bag checks. Even though the individual components of the good (e.g., bag checks) cannot be purchased a la carte, it is possible to observe the tradeoffs that people make as the characteristics of a composite good change to understand the relative importance of each component.

This approach requires the specification of a general utility function that governs respondent behavior, in which respondents make their decision in the choice experiment to maximize their utility. If, for example, the option of receiving a 50% risk reduction but paying an additional $5 yielded lower utility than the status quo (0% risk reduction and no additional payment), then the respondent would indicate a preference for the status quo. The parameters of the utility function are estimated to maximize the likelihood that the observed data (i.e., whether a respondent chose the status quo or the alternative) are consistent with the utility function (i.e., whether the utility of the status quo exceeds the utility derived from the alternative).

2.2. Venue Survey

This study relied on a conjoint survey of customers and potential customers of three major venues throughout the United States. The survey was administered through Qualtrics. Following a series of introductory questions that assessed respondent demographics and attitudes regarding security, there were a series of binary choice scenarios in which respondents were asked if they preferred an alternative to the status quo. The alternative scenarios varied by price increase, percentage reduction in risk, change in wait time, and whether the intervention would constitute an invasion of privacy. Table 5-1 shows the input parameter values.

The surveys were block randomized so that each respondent saw one combination of the Wait Time Increase, Invasion of Privacy, and Type of Risk and then subsequently saw the nine unique combinations of Price Increase and Risk Reduction. The text below shows an example of two questions that would be asked to the same respondent. Note that the payment amount and the amount of risk reduction varies between the questions but the duration of the wait time, the privacy implications, and the type of incident remains unchanged.

> "Would you be willing to pay an extra **$1** for admission to each event you attend at the Metropolitan Area Convention Center to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful act of assault or robbery involving a weapon to **half** of the current risk (a **50%** risk reduction) and would cause a 15-minute increase in wait times and would not involve any additional privacy invasion."

> "Would you be willing to pay an extra **$3** for admission to each event you attend at the Metropolitan Area Convention Center to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful act of assault or robbery involving a weapon to **90%** of the current risk (a **10%** risk reduction) and would cause a 15-minute increase in wait times and would not involve any additional privacy invasion."

Table 5-1. Input Parameter Values

Parameter	Values
Price Increase	$1, $3, $5
Risk Reduction	10%, 50%, 90%
Wait Time Increase	0 minutes, 5 minutes, 10 minutes, 15 minutes
Invasion of Privacy	Would involve some additional privacy invasions, Would not involve any additional privacy invasions
Type of Risk	Crime, Terrorism

3. Econometric Results

There were 1,276 survey respondents spread roughly evenly across the three venues. The responses were approximately evenly split between men and women. Income was reported in $10,000 buckets for incomes below $100,000 and then delineated from $100,000-$149,999 and above $150,000. Each income grouping was represented by at least 50 respondents. The majority of respondents had either some college or were college graduates, although there were respondents at all levels of educational experience. One important characteristic to note is that the respondents were overwhelmingly white (74%).

Respondents indicated that they would prefer the enhanced security measures in approximately 59% of all choice questions. Table 5-2 shows that the percentage of respondents who indicate a willingness to pay for added security declines as the additional expenditure increases, although even at the maximum payment of $5, over 40% of respondents would be willing to pay more for the security. Similarly, Table 5-3 shows the percentage of respondents who indicate answers that correspond with less than $1, $1-$3, $3-$5, and more than $5 in willingness to pay for risk reduction. These values are derived by counting the number of respondents who indicate they would be willing to pay one amount for a risk reduction but would not be willing to pay the next higher value. For example, if a respondent indicated that they would pay $1 for a 10% reduction in risk but would not pay $3 for a 10% reduction in risk, then that person's maximum willingness to pay for a 10% risk reduction must fall between $1 and $3. For each level of risk reduction, a plurality but not a majority of respondents were willing to spend more than $5 to achieve additional security. Unsurprisingly, the percentage of respondents who were willing to pay more than $5 increased as the risk reduction increased, but the changes were not dramatic. There was a difference of only ten percentage points in the likelihood that respondents indicated a value above $5 for a slight 10% risk reduction relative to a large 90% risk reduction. The percentage of respondents who indicated that they were not willing to pay $1 for risk reduction fell by approximately the same magnitude.

Table 5-2. Payment Percentage by Payment Amount

	$1	**$3**	**$5**
Percentage Who Would Pay	76.4%	58.0%	42.3%

Table 5-3. Individual Distribution of Willingness to Pay for Risk Reduction

	Less than $1	$1 to $3	$3 to $5	More than $5
10% Risk Reduction	28%	19%	15%	38%
50% Risk Reduction	24%	19%	17%	40%
90% Risk Reduction	19%	17%	16%	48%

The design of the survey precludes the ability to directly calculate the distribution of individual-level valuation placed on the secondary components of security interventions. At the aggregate level, there was not a consistent pattern in the proportion of respondents who indicated support for additional security measures and the associated wait-time impacts from those security measures.[1] There was no statistically significant impact of invasion of privacy or whether a security intervention was targeted towards terrorism rather than crime on the proportion of respondents who preferred the new security intervention.

3.1. Multinomial Logistic Regression Results

While the summary statistics presented in Tables 5-2 and 5-3 provide evidence of the value of risk reduction, these summary values cannot provide an overall estimate of the average willingness to pay for security. More importantly, they do not capture any information about the willingness to pay for the secondary effects (e.g., wait times and invasion of privacy) that result from the security changes. The multinomial logistic regression allows for this information to be incorporated into the decision-making process so that the willingness to pay for the secondary effects can be calculated alongside the willingness to pay for risk reduction.

Table 5-4 shows regression results from two primary specifications. As shown in the general summary statistics (Table 5-2), these results indicate the expected downward sloping relationship between price and the likelihood of accepting additional security (i.e., people are less likely to indicate support for more security as the cost of that security rises). Similarly, the reduction in risk has a statistically significant impact on the likelihood that a respondent would select additional security measures.

[1] While the proportion fell overall as the wait time increased, the impact was non-linear. There was a reduction in support for wait time increases of 5 minutes and 15 minutes relative to current wait times but not for wait time increases of 10 minutes.

Table 5-4. Multinomial Logistic Regression Results

	Answered Yes			
	(1)	**(2)**	**(3)**	**(4)**
Male	-0.045***	-0.044***	-0.045***	-0.045***
	(0.009)	(0.009)	(0.009)	(0.009)
Age	0.002***	0.002***	0.002***	0.002***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Payment Amount	-0.085***	-0.085***	-0.085***	-0.085***
	(0.003)	(0.003)	(0.003)	(0.003)
Percentage Point Reduction in Risk	0.001***	0.001***		
	(0.0001)	(0.0002)		
Baseline Risk Perception		-0.006***		-0.006***
		(0.001)		(0.001)
Change in Number of Incidents		-0.0001		-0.0001
		(0.002)		(0.002)
Change in Wait Time	-0.003***	-0.002***		
	(0.001)	(0.001)		
Risk Reduction: 50%			0.032***	0.032***
			(0.011)	(0.012)
Risk Reduction: 90%			0.096***	0.096***
			(0.011)	(0.015)
Wait Time: 5 minutes			-0.036***	-0.040***
			(0.012)	(0.012)
Wait Time: 10 minutes			-0.010	-0.011
			(0.012)	(0.012)

Wait Time: 15 minutes			-0.050***	-0.048***
			(0.012)	(0.012)
Privacy Invasion	0.012	0.010	0.011	0.010
	(0.009)	(0.009)	(0.009)	(0.009)
Crime Related	-0.007	-0.001	-0.007	-0.001
	(0.009)	(0.009)	(0.009)	(0.009)
Venue Dummies	Yes	Yes	Yes	Yes
Income Dummy	Yes	Yes	Yes	Yes
Observations	11,439	11,439	11,439	11,439
Log Likelihood	-7,524.227	-7,492.962	-7,517.425	-7,485.617

Note: *p**p***p<0.01

While respondents were provided with a specific percentage reduction in the likelihood of an incident occurring or being successful, this percentage reduction would have different implications depending on a respondent's belief about the underlying likelihood of an incident. Columns 2 and 4 include a specific control for the change in the number of expected incidents by multiplying the ex-ante perceived risk by the associated percentage risk reduction. Notably, while a belief that existing security intrusions are likely to be successful (i.e., current security standards are ineffective) is associated with an increased likelihood of preferring additional security, the change in the expected number of incidents has no statistically significant effect on people's willingness to pay for more security. This means that while those who believe current risks to be high are more likely to support additional security, they are no more likely to support it if it results in a 90% risk reduction rather than a 10% risk reduction.

3.2. Secondary Effects

There is evidence that increases in wait times influence the likelihood that a respondent would choose additional security measures, but this effect is sensitive to the functional form. When wait times are treated as continuous changes (Columns 1 and 2), there is evidence of a statistically significant impact of increased wait times on the decision to support more security. This impact is approximately 2-3 times the magnitude of the impact of a percentage point change in the risk reduction. When normalized, though, the importance of wait times becomes less prominent. The impact of a one standard deviation increase in wait times has approximately half the impact of a one standard deviation change in risk reduction on the likelihood that a respondent indicates support for new security measures.

This relationship is less clear when wait times and risk reduction changes are not treated as continuous. Survey respondents received discrete values of wait time changes (0, 5, 10, or 15 minutes) and risk reduction changes (10, 50, or 90 percent). Columns 3 and 4 use fixed effects

for these discrete values to measure the impact of risk reduction and wait time changes. Risk reduction shows a clear pattern in which respondents are more likely to select new security measures as the risk reduction magnitude increases. The impact of wait times, by contrast, is inconsistent across the distribution of wait-time changes. While there is a statistically significant difference between the proportion of respondents who support the new security measures when those measures result in 5- or 15-minute increases in wait times, there is no statistically significant difference between populations facing no change in wait time and those facing a 10-minute increase in wait times. Similarly, there is not a statistically significant difference between security intervention support for those facing 5-minute wait-time increases compared to those facing 15-minute wait-time increases. Theory would suggest that support for the new security measures should be lower for those facing the longer wait times. Taken together, there is some evidence that wait times have an impact on preferences for changes to venue security, but the evidence for this is relatively weak.

It is also worth noting that there is no statistically significant impact of invasion of privacy on utility, nor is there a differential effect between those facing crime rather than terrorism. This means that there is insufficient evidence to conclude that invasion of privacy or the terror/crime trade-off influences support for changes to security measures.

3.3. Calculation of Willingness to Pay for Characteristics

The monetary value of each parameter can be calculated by using the ratio of the coefficient of the parameter to the coefficient on the price change. Because the price change is denominated in dollars, this provides a measure of the relative importance of a parameter to money in the responses. In general, the formulation is $WTP_i = -\beta_i/\beta_{Payment}$ where *i* denotes a particular parameter of interest. Note that in most specifications, the coefficient on the payment amount is approximately 0.085, which is quite large relative to the other coefficients.

The average value placed on improved safety is generally quite low. In the continuous case (Columns 1 and 2), the average willingness to pay for an additional 1 percentage point reduction in the likelihood that an incident is successful is about 1.3 cents per person. Based on the construction of the survey, this indicates that a one standard deviation increase in the risk reduction percentage would be valued at approximately 42 cents per person. In the discrete cases (Columns 3 and 4), respondents value a 50 percentage point and 90 percentage point reduction in risk ($0.38 and $1.12, respectively) more than they value a 10 percentage point reduction in risk.

The willingness to pay for avoiding increased wait times is also small. Each additional minute of wait time is valued at about 3 cents per person on average. Based on the standard deviation of wait-time increases in the survey, this suggests that a one standard deviation increase in wait times would be valued at around 15 cents per person. In the discrete case (Columns 3 and 4), the coefficients are estimated relative to having no change in wait times. These results suggest that the willingness to pay to have no change in wait times rather than a 5- or 15-minute increase in wait time would be around 50 cents per person. Again, the results should be viewed with caution because of the theoretically unmotivated result that 10-minute wait-time changes do not have an impact.

In the case of invasion of privacy and of the terror/crime trade-off, the parameter values are not statistically different from zero. While there is variance and uncertainty in the estimates, this means that the data are unable to reject the hypothesis that these variables have a coefficient of 0 (i.e., no impact on the decision-making process). As a result, the data are unable to reject the hypothesis that respondents are not willing to pay for avoiding invasion of privacy or for switching risks from terrorism to crime. These secondary characteristics should be treated as having no impact on overall willingness to pay in any cost-benefit analysis.

3.4. Conditional Logistic Regression Results

The multinomial logistic regression has an important weakness because it treats all nine choice questions from each respondent as if they are from different respondents. This ignores two important characteristics of the decision-making process. First, the decisions that each individual will be correlated (e.g., if an individual is willing to pay $5, they would also be willing to pay $3 for the same scenario). Second, there are unobservable characteristics of the individual that influence the overall likelihood that they choose additional security. For example, one respondent may be generally pre-disposed to select additional security, regardless of the actual change in security magnitudes. Alternatively, some respondents may fundamentally believe that security is the responsibility of the venue and reject the notion that they should be required to pay anything for additional security.[2] This is consistent with the summary statistics presented in Table 5-2, which show relatively small changes in the proportion of people whose preferences are consistent with a given range of willingness to pay.

The conditional logistic regression allows for individual-specific correlation between these choice decisions. While this is preferable to multinomial logistic regression in the sense that multinomial logit treats correlated decisions as uncorrelated, conditional logistic regression can only identify the impact of parameters that vary within an individual's repeated decisions. As a result, characteristics that vary across individuals but do not vary within an individual cannot be included in the model. This removes both individual demographic characteristics like age and income, but also the other risk characteristics like wait time and invasion of privacy that were used for the block group randomization.

Regression results for the conditional logistic regression are presented in Table 5-5. Again, the willingness to pay for security improvements can be calculated by taking the ratio of the coefficients. These results conform with the multinomial logistic regression results and suggest that the valuation of an additional percentage point of risk reduction is valued at approximately 1.6 cents. Again, there is no evidence that people consider the expected number of events that will be offset by additional security. They instead focus exclusively on the percentage reduction.

[2] This sentiment appeared in comments provided in the Customer Survey.

Table 5-5. Multinomial Logistic Regression Results

	Answered Yes	
	(1)	**(2)**
Payment Amount	-0.827***	-0.827***
	(0.023)	(0.023)
Percentage Point Reduction in Risk	0.013***	0.013***
	(0.001)	(0.001)
Change in Number of Incidents		0.005
		(0.016)
Observations	11,484	11,484
Log Likelihood	-2,066.595	-2,066.553

Note: *p**p***p<0.01

While the conditional logistic regression precludes the ability to include individual-specific characteristics (either demographic or based on the block group randomization), the impact of these characteristics can be recovered in a second-stage estimation. The conditional logistic regression model results in individual-specific fixed effects – a baseline likelihood that a respondent chooses the status quo or an intervention regardless of the characteristics of the intervention itself. This results in a value for each respondent (but only one value for each person rather than a separate value for each of the nine scenarios they faced). The non-varying characteristics can then be regressed on these individual specific fixed effects to identify how these characteristics influenced their overall likelihood to support increased intervention.

Notably, the second-stage regression results found no statistically significant relationships between the fixed effect values and demographic or block group characteristics. This suggests that the impact of secondary characteristics of security interventions (e.g., wait times, invasion of privacy) and other demographic variables may not actually enter into the utility function (i.e., they do not influence willingness to pay for security changes). Given that these coefficients were not statistically significant, the conditional logistic model results can best be interpreted as finding no evidence of a willingness to pay for secondary security characteristics. The effects of these variables that were shown in the multinomial logistic regression results could be explained by variation across respondents' unobservable preferences for security interventions.

4. Conclusion

This chapter reports an analysis to estimate the private willingness to pay for changes in security at major venues using survey data from choice experiments. Because secondary characteristics associated with changing security decisions, like changes in wait times, could influence utility, the willingness to pay for these characteristics are estimated directly through the choice experiments. While the evidence suggests that customers and potential customers of the venue value increased security, the impact is low. In general, the results were consistent with respondents being willing to pay between 1 and 2 cents for each percentage point reduction in the likelihood that a crime or terrorist attack would be successful.[3] There is some evidence that avoiding wait time is valued at a similar rate, although these impacts are not detected in an alternative framework. There is also no evidence that invasion of privacy or the distinction between crime and terrorism influences the willingness to pay for security. Taken together, the willingness to pay for secondary security characteristics is unlikely to be important relative to the willingness to pay for risk reduction benefits.

While the individual estimates of willingness to pay are small, they must be viewed in the context of the venues themselves. These values indicate that a one-percentage point reduction in the likelihood that an attack is successful would result in 1.5 cents per person per event. Similarly, a one-minute change in wait times would be valued at 3 cents per person per event. Total benefits must be scaled across the number of customers at each event and the number of events for which increased security measures are effective. The changes in both risk and secondary impacts are unlikely to be marginal, and the total impact needs to be scaled by the relevant magnitude of the change (e.g., the number of minutes that wait times will change due to some new security protocol). In some cases, security enhancements will entail a single upfront expenditure, which results in long-lasting risk reduction (e.g., security cameras). In other cases, expenditures must take place each time the security enhancements are used (e.g., additional security personnel). This will influence the overall benefit-cost ratio of prospective security enhancements.

As an illustrative example, suppose a venue has the capacity for 20,000 customers, and a new security intervention was projected to reduce risk by 50% but increase wait times by 10 minutes. The total willingness to pay for the intervention would be $9,000 ($15,000 in risk reduction benefits and $6,000 in wait-time costs) per event. Because there was no evidence that respondents valued invasion of privacy or whether security was intended to reduce crime rather than terrorism, these other secondary effects do not enter into the calculation. It is likely that the overall cost-benefit analysis will hinge on the number of events for which security enhancements are in effect. If they persist over many years, the benefits of reduced risk and the costs of increased wait time could grow large. If they are short-lasting or must be paid at

[3] These results raise an important caveat to the internal validity of the survey responses. While respondents indicated a relatively high percentage change in attendance if additional countermeasures were put into place, the value placed on the risk reduction from these countermeasures would be low. This suggests that consumer demand is highly elastic (price responsive) because there is a large change in attendance for a security change with low value. Most research suggests that demand for sports attendance is highly inelastic (not price responsive).

each event, it is unlikely that either of these impacts will be large relative to the direct costs of implementing the security changes.

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Chapter 6. Direct and Indirect Economic Impacts

Adam Rose and Dan Wei, Leads

1. Introduction

This chapter presents the bottom-line economic impacts of terrorism countermeasures on business revenue at three public assembly venues and on their surrounding regional economic activity. The analysis is based primarily on survey responses relating to changes in attendance that stem from the implementation of the various countermeasures.

The objective of implementing terrorism countermeasures is to reduce the potential of a terrorist event. However, we also investigate the economic impacts of two sets of spillover effects. Negative spillovers refer to the possibility that the countermeasures will decrease attendance as a result of delays and invasion of privacy. Positive spillovers stem from the fact that people feel safer, not only with regard to terrorism but also to ordinary crime.

In this chapter, we measure the direct and indirect economic impacts of changes in attendance for both the intended purpose of countermeasures and of the various types of spillover effects. The analysis is based on our survey responses, supplementary data on attendance and customer spending, and the use of regional economic impact models.

Economic impact analysis of public assembly sites, such as stadiums and convention centers, has been prevalent in the literature for many years. However, the examination of counterterrorism spillover effects is rather new. We build on the study by Rose et al. (2014), which estimated the economic impacts of both positive and negative spillover effects of terrorism countermeasures in mid-town Manhattan. However, that study was not based on results for any specific sites, nor did it include any public assembly venues, in contrast to the current study.

Note that our analysis involves some critical assumptions, and therefore we performed sensitivity tests presented at the end of the chapter. The main results presented first are for a lower-bound estimate in order to be on the conservative side. The outcome of the sensitivity tests, however, confirm that our results are robust.

2. Survey Questions

The survey questions pertinent to this analysis ask respondents whether they would be more or less likely to attend events at the venue in light of specific terrorism countermeasures. Most of the questions ask for specificity in terms of percentage changes in attendance. A set of related questions asks respondents about their willingness to pay both to enhance security and to avoid negative spillovers. The analysis of these related questions can be found in the accompanying Chapter 5.

As an example, following are the questions related to patrons' attitudes toward video cameras in relation to their likelihood of attending the Metropolitan Area Convention Center.

Q1. Since the venue increased its use **of video cameras** for surveillance, has that affected your likelihood of attending the Metropolitan Area Convention Center?

- ○ Decreased my likelihood of attending
- ○ No change in my likelihood of attending
- ○ Increased my likelihood of attending

For those who chose "Increased my likelihood of attending" in Q1, they were next asked:

Q2. Since the venue increased its use of **video cameras** for surveillance, how much has it increased your likelihood of attending the Metropolitan Area Convention Center?

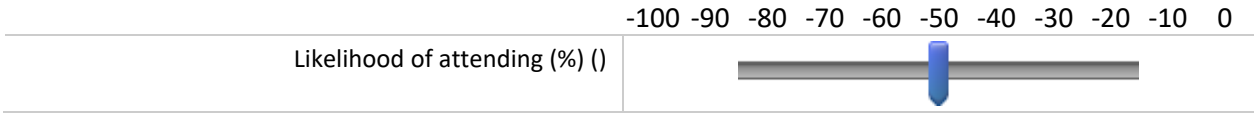
For example, if you would have attended 3 events but now you would attend 6 events, that is an increase of 100%.

- ○ Increased my likelihood of attending by up to 100%
- ○ Increased my likelihood of attending by more than 100%

For those who chose "Decreased my likelihood of attending" in Q1, they were next asked:

Q3. Since the venue increased their use of **video cameras** for surveillance, what percent has your likelihood of attending the Metropolitan Area Convention Center decreased by?

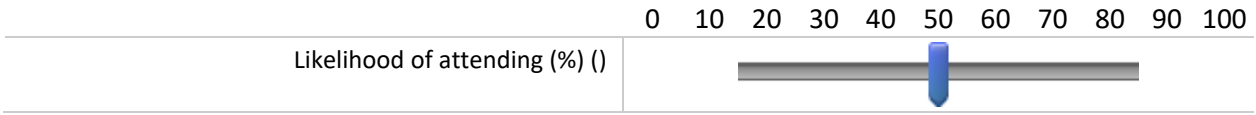
For example, if you would have attended 4 events but now you would only attend 2, that is a decrease of 50%.



For those who chose "Increased my likelihood of attending by up to 100%" in Q2, they were next asked:

Q4. Since the venue increased its use of **video cameras** for surveillance, what percent has your likelihood of attending Metropolitan Area Convention Center increased by?

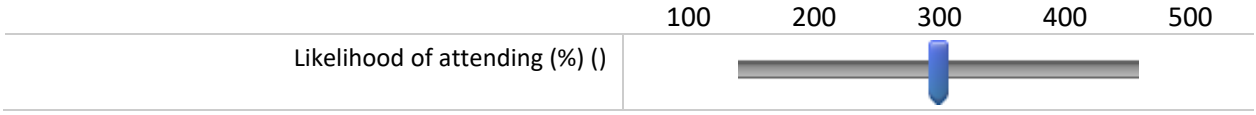
For example, if you would have attended 4 events but now you would attend 6, that is an increase of 50%.



For those who chose "Increased my likelihood of attending by more than 100%" in Q2, they were next asked:

Q5. Since the venue increased its use of **video cameras** for surveillance, what percent has your likelihood of attending Metropolitan Area Convention Center increased by?

For example, if you would have attended 4 events but now you would attend 12, that is an increase of 200%.



3. Survey and Other Data Related to Changes in Attendance

Table 6-1 presents the survey results on the changes in the likelihood of attending each venue after implementation of the four countermeasures for patrons of the three venues (four event types). These data were obtained through the specific venue surveys described in Chapters 3 and 4 and in the appendix of Chapter 3. The percentage changes in Table 6-1 represent lower-bound estimates. A detailed explanation of alternative key assumptions adopted (including the results of upper-bound estimates) is presented in Section 5 of this chapter.

For each respondent, there is a possibility of both positive (enhanced security) and negative effects (invasion of privacy and delay) of the increased use of countermeasures that influence their decision on attendance. For those who indicated an increased likelihood of attending, the positive effects exceed the negative ones. On the other hand, for those who indicated a decreased likelihood of attending, the negative effects exceed the positive effects. The survey results reveal the net effect of the positive and negative effects on customers' decisions. The survey results on a qualitative question about attendance (see Chapter 4) indicate that for all four venue/event types, the "more likely attending" response

overwhelmed the "less likely attending" response (i.e., the positive "net effect" overwhelmed the negative "net effect"), though a sizable majority for all four venue/event types indicated the presence of countermeasures had no effect on their attendance. The results are evenly split in terms of people residing within the metro area indicating a higher or lower percentage increase in likelihood of attending than visitors from outside of the metro area. Interestingly, note that the NBA and NHL games in the same venue fall on either side of this question. Also, we note that people visiting the Metropolitan Area Convention Center are more likely to increase their visits to the venues after the increased use of countermeasures because a higher proportion of convention center visitors typically reside elsewhere than for sporting events, and patrons are more concerned with security in a geographic area with which they are unfamiliar. Finally, the findings differ only slightly across countermeasures.[1]

Table 6-1. Changes in Likelihood of Attendance at Four Venue/Event Types (Lower-Bound Estimates)

Venue	Attendees from the MSA	Attendees from outside of the MSA
MLB (193/93)	23.8%	20.8%
NBA (126/13)	41.2%	45.8%
NHL (130/23)	11.7%	8.4%
MACC (153/52)	42.8%	60.0%

Note: Sample sizes for attendees inside and outside the Metro Area are presented in the parentheses following the venue titles (the first number is for within the Metro Area and the second number is for outside of the Metro Area).

Table 6-2 presents a range of total number of annual attendees for the four selected venue/event types in the most recent year that data are available. We only provided a range for attendance so as not to divulge the identity of the venue. Table 6-3 presents the average ticket price based on the survey results. The ticket price for each venue represents an average price of the reported ticket prices from the survey (a combination of regular and possible premium tickets, with the latter including amenities such as parking, complimentary food, and other sales that come with the ticket).

[1] Note that the survey questions and analysis in this report are prospective. Even though the counter measures are already in place, survey respondents were asked how these measures affect their future likelihood of attendance.

Table 6-2. Total Annual Attendance by Venue

Venue	Data	Year
MLB	2 to 3 million	2019
NBA	0.5 to 1.0 million	2018-19
NHL	0.5 to 1.0 million	2018-19
MACC	2 to 3 million	2019

Table 6-3. Average Typical Ticket Price by Venue 2016-2019 (Based on Survey Results)

Venue	Attendees Inside Metro	Attendees Outside Metro
MLB	$51.61	$51.45
NBA	$76.71	$91.92
NHL	$89.46	$94.13
MACC	$48.59	$58.08

Note: Sample sizes for attendees inside and outside the Metro are the same as in Table 6-1.

4. Impacts on Business Sales Revenue

Table 6-4 summarizes the lower-bound estimates based on the survey results on changes in the likelihood of attendance at the venues motivated by the implementation of the terrorism countermeasures. These results are multiplied by the survey results on average ticket prices to arrive at changes in ticket sales revenue for our best estimate, which we have designated as a "lower-bound." The venue for which the existence of countermeasures has the likely greatest effect on ticket sales revenue is the Metro Area Convention Center (MACC), despite its low average ticket prices relative to the other venues. The major factor influencing this result is that this venue has the highest proportion of respondents indicating that countermeasures have had an increased effect on their attendance. At the other end of the range is the NHL team at the Sports Arena, despite having the highest ticket prices of any venue.

5. Regional Economic Impacts

A number of regional economic impact analysis models were available to us, including state-of-the-art computable general equilibrium (CGE) analysis. This modeling approach was

used in Rose et al. (2014) because that study included an examination of the benefits of the countermeasures in terms of reducing the economic consequences of major types of terrorist attacks, which potentially have huge impacts on economic activity. CGE is needed when economic impacts are large and are likely to strain the resource base, resulting in major types of substitutions and price increases (Rose, 1995). This is not the case for examining only the effects of attendance at sports complexes and convention centers. Therefore, we've chosen to adopt an input-output (I-O) analysis approach, the most commonly used tool of regional economic impact studies in general and a mainstay of most sports impact studies to date. In our case, the impacts examined will be even lower than the standard general operating impacts because we are simply measuring changes. Thus, I-O analysis is appropriate to the task and also more transparent than is CGE analysis.

The general literature on regional economic impacts of public assembly sites such as sports/entertainment/recreational facilities has gone through an important evolution, but it is still controversial. Much of the controversy stems from the general concerns in the benefit-cost analysis literature about new projects or expansion of existing ones, including that: expansion – when full employment is present – simply displaces other activities, consumer spending on one activity within the region in question simply displaces other spending there, much of the revenues are likely to go to "absentee" owners, and the multiplier general equilibrium effects are often exaggerated (see, e.g., OMB, 1992; Boardman et al., 2011). More recently, however, there have been analyses or guidelines that are more positive about the worthiness of the direct and indirect effects of such activities (see, e.g., Farrow and Rose, 2018), calling attention

Table 6-4. Changes in Attendance and Ticket Sales due to the Implementation of Countermeasures – Lower-Bound Estimate

Venue	Attendees from the MSA			Attendees from outside the MSA			Total Changes in Ticket Sales (10^6 2018$)
	Change in Attendance		Change in Ticket Sales (10^6 2018$)	Change in Attendance		Change in Ticket Sales (10^6 2018$)	
	Percent	Amount (10^3)		Percent	Amount (10^3)		
MLB	23.8%	482	24.9	20.8%	201	10.3	35.2
NBA	41.2%	242	18.5	45.8%	41	3.8	22.3
NHL	11.7%	79	7.1	8.4%	9	0.8	7.9
MACC	42.8%	704	34.2	60.0%	434	25.2	59.4

Note: Sample sizes for attendees inside and outside the Metro Area are the same as in Table 6-1.

to considerations such as the fact that full employment is often not present, and, even if it were, geographic labor mobility overcomes the obstacle.[2]

Earlier studies of the impacts of sports and entertainment facilities were biased toward showing large impacts to justify their construction or the offer of tax breaks to retain their tenants. The source of this bias was primarily inclusion of the spending by all attendees at these venues (area residents or otherwise) and other expenditures incurred in the host region as part of the regional economic impacts. However, those living within the host region are likely to apply some or all of their intended spending at the site in question elsewhere within the region if they do not attend the sports/entertainment events; hence, there is for the most part, only a substitution effect of economic activities within the region, rather than any direct stimulus (see, e.g., CEDR, 2018). The stimulus would arise from the attraction of fans from outside the region, who add to its economic base.

We have invoked a similar substitution effect assumption in our analysis.[3] Thus, a key aspect of the analysis is to distinguish the home location of spectators/customers. This is facilitated by the fact that one of the questions in the survey asks for ZIP Code information. For our purposes, we define the host region as the Metropolitan Area surrounding the site and consider anyone coming from outside the Metro Area as providing a spending injection, and we use the I-O model of the Metro region to estimate the total (or multiplier) effects of the direct spending. We have also decided to use the number of respondents to our Customer Survey that reside within the MSA vs. those with a place of residence outside of the MSA to approximate the percentage of attendees that are local vs. non-local for each venue. Using this approach, it is estimated that 32.4%, 13.3%, and 30.5% of the patrons to the MLB Stadium, NHL/NBA Arena, and MACC, respectively, reside outside of the MSA region.

5.1. Methodological Overview

Our analysis consists of the following steps:

1. Compile background data on venue attendance, ticket prices, concession sales, and spending vectors (distinguish between in-region and out-of-region visitors).

[2] The geography of the issue comes into play in a couple of ways and is controversial as well. For example, should the well-being of the in-migrants taking the new positions count, should the well-being of those visiting the region to partake in activities count, and are not all of these effects simply a transfer within a broader region or the nation as a whole? In our assessment, implicitly the well-being of workers moving into the region would count, the well-being of visitors would not, and the region itself is a worthy area of analysis, separate from other regions and the nation as a whole.

[3] Note that this represents a conservative estimate, and moves us toward a lower-bound impact. For example, if a sports arena is not available within the region, rabid fans may travel outside the region to watch games, or they may save some of what they intended to spend. Other stimuli are also factored into more general sports venue impact studies, but are not likely to be affected by changes in attendance related to terrorism countermeasures in any significant way. This includes television/radio revenues, which stimulate the local economy to the extent that owners are in-region residents. This applies also to property value increases, including agglomeration effects such as entertainment zones, attributable to the facility. Changes in attendance also affect tax revenues from lodging, restaurants, and on-site concessions, but this is basically another example of the substitution effect of spending.

2. Compile data from the surveys on percentage changes in attendance relating to each countermeasure and each type of direct spillover effect. Translate the percentage changes into change levels, based on five-year average attendance (this is a smaller number of years for one of our sites due to its recent construction).

3. Match spending categories with I-O model sector classifications (at 3-digit NAICS level as shown in Appendix 6A), and inject the spending into the I-O model as a positive or negative direct change in Final Demand for each countermeasure/spillover effects/venue combination.

4. Run the I-O models.

5. Sum all of the positive and negative individual direct and spillover regional economic impact combinations in absolute and percentage terms to obtain the regional economic impacts.

6. Perform sensitivity tests.

7. Interpret the results.

5.2. Data on Spending Vectors

Professional Baseball

Appendix Table 6B-1 presents a summary of the spending vector of baseball spectators attending events in the Atlanta SunTrust Park (CEDR, 2018).[4] The expenditures are distributed into six aggregated spending categories (Accommodations, Restaurants, Retail, Entertainment/Recreation, Transportation, and Other). Both dollar values and percentage spending are presented. The numbers are calculated on a per-visitor and per-day basis and are converted to 2018 dollars. The study assumes that, on average, the non-local visitors will spend one day of their trip visiting the SunTrust Park. One thing to note in the spending vectors is that Transportation spending only pertains to local transportation because none of the relevant studies in the literature consider en-route spending, such as airfares, as a stimulus to the host region.

The average number of days the baseball game attendees spend per trip varies from one to four days:

- A study for the Atlanta Braves baseball stadium noted many out-of-town visitors are in the area primarily for other purposes, and they assume that one day of their trip is baseball-related (CEDR, 2018).
- Evans (2018) found that the median number of travel days for baseball Spring Training is four, but Spring Training trips may be longer than trips during the regular season.

[4] We note that Atlanta Trust Park was not one of the venues surveyed in the study.

- Dixon et al. (2013) found that out-of-town visitors at university baseball games tended to spend one day in the local area, while weekend visitors tended to spend three days.

In this study, we assume that, on average, attendees of the MLB games from outside of the Metropolitan Statistical Area (MSA) spend 1.67 days in the region (we have given more weight to the estimate reported in the CEDR [2018] study because it is the only study pertaining to MLB games in the regular season).

Professional Basketball/Hockey

Appendix Table 6B-2 presents the spending vectors by major spending categories obtained from an economic impact study of the proposed Seattle Arena (Pro Forma Advisors LLC, 2013). Valuable information includes differentiation in the spending amounts by origin of the visitors (e.g., city or county resident, those from outside of the county, or those from outside of the state). We use the "Outside of County" spending vector for in-state visitors coming from outside of the metro area where the arena venue is located.

A survey of hockey fans (Mohan, 2007) asked them what kind of trip they would take to see their team in another city. 46% of the respondents indicated that they would do two- to three-day trips, and 25% of them indicated that they would do a one-day trip during the weekend with no overnight stay. Based on this survey, we assume that, on average, attendees of the NHL/NBA games from outside of the MSA region stay 1.8 days in the region.

Convention Centers

Appendix Tables 6B-3 to 6B-6 present the spending vectors of convention center visitors from the literature. Tables 6B-3 and Table 6B-4 provide the spending amounts for both overnight and daytrip attendees (HVS, 2019; HVS, 2014). We use the former for in-state but non-local visitors. Table 6B-5 and Table 6B-6 provide additional spending vectors for overnight convention center visitors (PCVB, 2019; Ortiz, 2018). However, in contrast to the spending vectors presented in other tables, the data provided by these studies pertain to the expenditures per event or trip. Unfortunately, these studies did not provide the data on the average number of days stayed; however, based on the HVS (2014) study, we estimated that average attendee days are 2.17. This estimate is used to convert all spending vectors to a per-visitor day basis in Tables 6B-5 and 6B-6. In Table 6B-7, we calculated the average spending vector of the convention center attendees based on the four studies presented in Tables 6B-3 to 6B-6.

5.3. Input-Output Modeling

Input-output (I-O) analysis is applied to evaluate the regional and state economic impacts of the spillover effects of terrorism countermeasures implemented at the three selected public assembly sites. I-O analysis, developed by Nobel laureate Wassily Leontief, is the most widely used tool of regional economic impact analysis in the U.S. and throughout the world. It is especially adept at estimating ripple, or multiplier, effects. I-O can be defined as a static, linear model of all purchases and sales between sectors of an economy, based on the

technological relationships of production (Rose and Miernyk, 1989). An I-O model provides detailed information on the interrelationships between producing sectors in an economy. I-O models also include households as a “consuming” sector, and thus incorporate household spending effects into the multiplier calculation (Miller and Blair, 2009).

In an I-O analysis, it is important to distinguish between the two types of second-order effects. The first are “indirect” effects, which represent the interaction between producing sectors. The second type are "induced" effects, which represent the interaction between households and producing sectors: production generates income paid to households, which in turn spend a major portion of this income on produced goods and services, thereby generating additional multiplier effects.

For this study, we use the most widely applied source of regional I-O tables, the Impact Analysis for Planning (IMPLAN) System (IMPLAN, 2019). This system consists of three components: 1) a study region (state, county, or sub-county) data base, 2) a set of algorithms capable of generating I-O tables for any state, county, or sub-county group, and 3) a computational capability for calculating multipliers and performing impact analyses. The IMPLAN sectoring scheme is currently based on the North American Industrial Classification System (NAICS), and includes the details of 536 sectors (IMPLAN, 2016). In this study, we aggregate the 536 sectors into 86 sectors corresponding to the 3-digit NAICS codes. The details of the 86 sectors, including their correspondence to the IMPLAN sectors, are shown in Appendix Table 6A-1.

I-O modeling has both demand-side and supply-side versions (Miller and Blair, 2009). The demand-side I-O model is the standard version, where a change in final demand affects the economy by causing product supply to respond through a multiplier process. The supply-side I-O model is a variant of the standard model in which the impacts to the economy take place through the production side of the economy. In this study, however, only the demand-side I-O model is applied to analyze how changes in attendance, and thus changes in expenditures by the spectators or convention attendees, result in impacts to successive rounds of supplying sectors in the upstream of the supply-chain. Since the expenditure changes pertain to spending on consumer goods and services, they do not generate any supply-side impacts further down a supply chain.

The Metro region where each public assembly site is located is defined as the formal Metropolitan Statistical Area (MSA), delineated by the U.S. Office of Management and Budget.

5.4. Lower-Bound Results

For each of the four venue/event types, the associated patron expenditure vector developed in the previous section is injected into the relevant regional I-O model as a change in the Personal Consumption component of Final Demand.[5] Table 6-5 presents the lower-bound direct spending vectors we used as inputs in the I-O analysis. The I-O model then calculates the

[5] For all three venues, the patron expenditure needed to be further disaggregated to match the sectoring scheme of the regional I-O table. This required disaggregating some general categories of expenditure into disaggregated IMPLAN sectors. This was done by using the gross output of the relevant IMPLAN sectors as weights.

direct and indirect input requirements throughout the economy to deliver the additional consumer goods and services. We remind the reader that the direct expenditures by residents of the Metro Area are not included in this stimulus analysis because of the prevailing assumption that their expenditures on an entertainment event within their Metro Area simply substitute for a like amount of other spending within the Area. Of course, this means that any indirect effects of the spending by local patrons at these venues does not factor in as well.

The results for the three venues (four event types) are presented in Table 6-6 in terms of gross output (business sales revenue), regional GDP, personal income, and employment. The percentage impacts with respect to these macroeconomic indicators[6] are presented in parentheses in the table as well. For the MLB Stadium, the $53 million additional direct spending translates into $113 million of total additional economic activity in the Metro Area in terms of gross output, $68 million of additional GDP, $46 million of personal income, and 1,075 additional jobs.[7] The ratio of total additional gross output to direct spending is 2.11 (the size of the gross output multiplier).[8] This means every dollar of direct spending within the Metro Area generates an additional $1.11 within its boundaries.

Table 6-5. Direct Spending Vectors Used as Inputs in the I-O Analysis – Lower-Bound Estimate (in millions of 2018$)

Sector #	Description	MLB Stadium	NBA Arena	NHL Arena	MACC
37	445 Food & Beverage Stores	1.7	0.2	0.0	5.0
38	446 Health & Personal Care Stores	0.8	0.1	0.0	3.0
39	447 Gasoline Stations	0.4	0.0	0.0	1.4
40	448 Clothing & Accessories Stores	1.1	0.1	0.0	4.2
41	451 Sporting Goods, Hobby, Book, & Music Stores	0.5	0.0	0.0	0.9
42	452 General Merchandise Stores	1.8	0.2	0.0	4.2
43	453 Miscellaneous Store Retailers	0.6	0.1	0.0	2.0
49	485 Transit & Ground Passengers	3.6	0.0	0.0	28.9
66	532 Rental & Leasing Svcs	0.0	0.5	0.1	0.0
77	711 Performing Arts & Spectator Sports	24.5	7.3	1.6	54.7

[6] Note that we are performing an economic consequence analysis, rather than a benefit-cost analysis (see Rose et al., 2014, for a discussion of the distinction). This means that we are using macroeconomic indicators, rather than what are termed "welfare measures" (measures of economic well-being), such as equivalent variation approximations to consumer surplus. However, it has become standard to use personal income as a proxy for such measures.

[7] All results in this and other tables in this chapter that are expressed in dollar terms are in 2018 dollars.

[8] The multipliers for the three regions (MSAs) in this study are all around 2.0. This is a rather conservative multiplier for large metropolitan areas, in part because it factors out the leakage in the direct and indirect spending stream. In the model we use, income payments are limited, such that they would exclude returns to owners of capital who reside outside the region, and spending on imports of final goods by consumers or imports of intermediate goods by producers is excluded in calculation of indirect and induced effects. Moreover, only demand-side multipliers (upstream supply-chain linkages) are included, and supply-side multipliers (down-stream linkages) are not.

78	712 Museums & Similar	0.3	0.0	0.0	4.5
79	713 Amusement, Gambling & Recreation	3.3	0.3	0.1	68.8
80	721 Accommodations	5.8	0.5	0.1	169.0
81	722 Food Svcs & Drinking Places	9.0	0.9	0.2	31.9
	Total	**46.6**	**9.5**	**2.1**	**357.8**

Table 6-6. Summary Economic Impacts of Increased Attendance at the Four Venue/Event Types on their MSA Regions – Lower-Bound Estimate

	Output (10^6 $)	GDP (10^6 $)	Income (10^6 $)	Employment (# of jobs)
MLB Stadium	112.7	67.9	45.6	1,075
	0.033%	0.033%	0.034%	0.055%
NBA Arena	21.3	13.0	8.3	202
	0.004%	0.005%	0.005%	0.008%
NHL Arena	4.6	2.8	1.8	44
	0.001%	0.001%	0.001%	0.002%
MACC	735.4	462.6	286.8	6,166
	0.046%	0.047%	0.050%	0.073%

Notes: Output, GDP, Income Impacts are in millions of 2018$; Employment Impacts are in number of jobs; % impacts are with respect to regional baseline levels.

The results for the NBA and NHL Arena are presented next in Table 6-6 in terms of the four major macroeconomic indicators. For the NBA events, the $10 million additional direct spending translates into $21 million of total additional economic activity in the Metro Area, $13 million of additional GDP, $8 million of personal income, and 202 additional jobs. For the NHL events, the $2.2 million additional direct spending translates into $4.6 million of total additional economic activity in the Metro Area, $2.8 million of additional GDP, $1.8 million of personal income, and 44 additional jobs. The ratio of total additional economic activity to direct spending is 2.06 in both cases.

For MACC, the $378 million additional direct spending translates into $735 million of total additional economic activity in the Metro Area, $463 million of additional GDP, $287 million of personal income, and 6,166 additional jobs. The gross output multiplier is slightly less than 2.0.

The regional economic impacts for the Arena are the lowest among the three venues, primarily because the average daily spending is only $47.90, compared to $107.60 for the MLB Stadium and $344.10 for the MACC. The Arena also has the smallest percentage of attendees (13.3%) who reside outside of its Metro Area (compared to 32.4% for the MLB Stadium and 30.5% for the MACC).

The sectoral results for MLB Stadium are presented in Table 6-7 as an example. Not surprisingly, the most impacted sectors are those associated with the direct tourism spending, such as Performing Arts & Spectator Sports, Retail Trade, Accommodations, Food Services & Drinking Places, and Transit & Ground Passengers Transportation. Other sectors that were most stimulated through intersectoral linkages (the supply-chain effect) include Real Estate, Professional, Scientific & Tech Services, Health Care, and Wholesale Trade.

Table 6-7. Sectoral Economic Impacts of Increased Attendance at the MLB Stadium on the MSA Region – Lower-Bound Estimate

	Sector	Direct Spending (10^6 $)	Gross Output (10^6 $)	GDP (10^6 $)	Personal Income (10^6 $)	Employment (jobs)
1	111 Crop Farming	0.00	0.01	0.01	0.00	0
2	112 Livestock	0.00	0.01	0.00	0.00	0
3	113 Forestry & Logging	0.00	0.00	0.00	0.00	0
4	114 Fishing, Hunting & Trapping	0.00	0.01	0.00	0.00	0
5	115 Ag & Forestry Svcs	0.00	0.00	0.00	0.00	0
6	211 Oil & Gas Extraction	0.00	0.33	0.27	0.29	1
7	212 Mining	0.00	0.03	0.01	0.00	0
8	213 Mining Services	0.00	0.03	0.02	0.02	0
9	221 Utilities	0.00	1.38	0.59	0.24	1
10	230 Construction	0.00	0.79	0.41	0.28	5
11	311 Food products	0.00	0.55	0.13	0.08	1
12	312 Beverage & Tobacco	0.00	0.42	0.12	0.05	1
13	313 Textile Mills	0.00	0.00	0.00	0.00	0
14	314 Textile Products	0.00	0.01	0.00	0.00	0
15	315 Apparel	0.00	0.00	0.00	0.00	0
16	316 Leather & Allied	0.00	0.00	0.00	0.00	0
17	321 Wood Products	0.00	0.04	0.01	0.01	0
18	322 Paper Manufacturing	0.00	0.09	0.02	0.02	0
19	323 Printing & Related	0.00	0.12	0.05	0.04	1
20	324 Petroleum & Coal Products	0.00	0.66	0.26	0.04	0
21	325 Chemical Manufacturing	0.00	0.16	0.05	0.03	0
22	326 Plastics & Rubber Products	0.00	0.06	0.02	0.01	0
23	327 Nonmetal Mineral Products	0.00	0.09	0.04	0.02	0
24	331 Primary Metal Mfg	0.00	0.00	0.00	0.00	0
25	332 Fabricated Metal Products	0.00	0.09	0.03	0.02	0
26	333 Machinery Mfg	0.00	0.01	0.00	0.00	0
27	334 Computer & Electronic Products	0.00	0.03	0.01	0.01	0
28	335 Electrical Eqpt & Appliances	0.00	0.01	0.00	0.00	0
29	336 Transportation Eqpmt	0.00	0.05	0.02	0.02	0
30	337 Furniture & Related Products	0.00	0.04	0.01	0.01	0
31	339 Miscellaneous Mfg	0.00	0.05	0.02	0.01	0
32	42 Wholesale Trade	0.00	2.47	1.65	0.97	10
33	441 Motor Veh & Parts Dealers	0.00	0.41	0.32	0.21	3

	Sector	Direct Spending (10^6 $)	Gross Output (10^6 $)	GDP (10^6 $)	Personal Income (10^6 $)	Employment (jobs)
34	442 Furniture & Home Furnishings	0.00	0.15	0.10	0.06	1
35	443 Electronics & Appliances Stores	0.00	0.08	0.05	0.06	1
36	444 Bldg Materials & Garden Dealers	0.00	0.29	0.18	0.11	3
37	445 Food & Beverage Stores	1.67	2.14	1.47	0.99	29
38	446 Health & Personal Care	0.84	1.05	0.66	0.46	11
39	447 Gasoline Stations	0.39	0.49	0.31	0.25	7
40	448 Clothing & Accessories Stores	1.07	1.35	0.82	0.39	16
41	451 Sporting Goods, Hobby, Book, & Music Stores	0.49	0.60	0.39	0.28	11
42	452 General Merchandise Stores	1.77	2.27	1.47	0.92	31
43	453 Miscellaneous Store Retailers	0.62	0.78	0.48	0.42	20
44	454 Non-Store Retailers	0.00	0.50	0.26	0.07	4
45	481 Air Transportation	0.00	0.42	0.21	0.11	1
46	482 Rail Transportation	0.00	0.07	0.04	0.02	0
47	483 Water Transportation	0.00	0.00	0.00	0.00	0
48	484 Truck Transportation	0.00	0.55	0.26	0.22	3
49	485 Transit & Ground Passengers	3.62	4.07	1.72	2.23	67
50	486 Pipeline Transportation	0.00	0.04	0.04	0.07	0
51	487 Sightseeing Transportation	0.00	0.23	0.12	0.10	1
52	492 Postal service, Couriers & Messengers	0.00	0.49	0.33	0.27	4
53	493 Warehousing & Storage	0.00	0.25	0.15	0.13	3
54	511 Publishing Industries	0.00	0.42	0.29	0.14	1
55	512 Motion Picture & Sound Recording	0.00	0.14	0.09	0.05	1
56	515 Broadcasting	0.00	0.54	0.16	0.07	1
57	517 Telecommunications	0.00	1.98	0.98	0.31	3
58	518 Internet & Data Process Svcs	0.00	0.32	0.13	0.12	1
59	519 Other Information Services	0.00	0.22	0.07	0.05	0
60	521 Monetary Authorities	0.00	0.90	0.58	0.31	3
61	522 Credit Intermediation & Related	0.00	0.85	0.47	0.45	5
62	523 Securities & Other Financial	0.00	1.50	0.53	0.51	9
63	524 Insurance Carriers & Related	0.00	3.06	1.49	0.93	11
64	525 Funds, Trusts, & Other Financial Vehicles	0.00	0.49	0.20	0.04	2
65	531 Real Estate	0.00	10.16	7.01	0.57	28
66	532 Rental & Leasing Svcs	0.00	0.38	0.22	0.10	2
67	533 Lessor of Nonfinance Intangible Assets	0.00	0.49	0.29	0.01	0
68	541 Professional, Scientific & Tech Svcs	0.00	5.74	3.74	3.23	36
69	551 Management of Companies	0.00	1.76	1.13	0.96	7
70	561 Admin Support Svcs	0.00	2.69	1.86	1.50	36

	Sector	Direct Spending (10^6 $)	Gross Output (10^6 $)	GDP (10^6 $)	Personal Income (10^6 $)	Employment (jobs)
71	562 Waste Mgmt & Remediation Svcs	0.00	0.37	0.18	0.12	2
72	611 Educational Svcs	0.00	0.69	0.44	0.42	12
73	621 Ambulatory Health Care	0.00	2.29	1.52	1.39	19
74	622 Hospitals	0.00	1.39	0.79	0.71	9
75	623 Nursing & Residential Care	0.00	0.39	0.25	0.24	6
76	624 Social Assistance	0.00	0.43	0.28	0.26	10
77	711 Performing Arts & Spectator Sports	24.51	27.89	17.44	14.55	318
78	712 Museums & Similar	0.28	0.31	0.15	0.16	4
79	713 Amusement, Gambling & Recreation	3.35	3.82	2.47	1.05	39
80	721 Accommodations	5.78	5.81	3.49	1.75	56
81	722 Food Svcs & Drinking Places	9.03	11.27	6.46	4.33	179
82	811 Repair & Maintenance	0.00	0.94	0.65	0.53	9
83	812 Personal & laundry Svcs	0.00	0.48	0.30	0.36	12
84	813 Religious, Grantmaking, & Similar Orgs	0.00	0.54	0.41	0.22	4
85	814 Private Households	0.00	0.05	0.05	0.05	4
86	92 Government	0.00	0.65	0.64	0.53	7
	Total	**53.41**	**112.71**	**67.94**	**45.55**	**1,075**

6. Sensitivity Analysis

6.1. Basic Considerations

The sensitivity analysis was restricted to customers who attended Convention Center events and MLB games over the past four years (2016-2019) and to customers who attended NHL and NBA games over the past three years (2017-2019); customers who attended events before these dates but not after and potential customers who never attended an event were excluded (see Chapter4). Sensitivity was assessed using different assumptions about survey responses (described below) to produce both upper- and lower-bound estimates of the change in intention to attend future events at the venue.

The number of annual events per year for each customer was calculated by dividing the sum of the number of events that they attended over the four-year period (CC and MLB) or 2.5-year period (NBA and NHL) by the time period. Responses for the number of events attended are either zero, one, or two or more. For customers responding two or more, the lower-bound estimate assumes that two or more = three events; the upper-bound estimate assumes that two or more = five events.

For each customer in each venue and event type, their indicated percentage change in likely attendance (increase, decrease, or no change = 0%) resulting from the increased

deployment for each of the four countermeasures is used. The lower-bound estimate uses the maximum percentage change across all four countermeasures for each customer (increase or 0% in nearly all cases), and then caps the percentage change value at 100; the upper-bound estimate uses the maximum value between either the lower-bound estimate or the sum of percentage changes across all four countermeasures divided by two, and the percentage change value is not capped at 100. Logically, the customer changes in attendance are specific to each countermeasure; hence, changes are cumulative across the four countermeasures and should be summed. The upper-bound estimate captures this, but discounts the results based on considerations of marginally decreasing impact (diminishing returns or redundancy) and perceptions of overlapping multiple countermeasures.

For each customer within each venue and event type, the annual change in likely attendance is the product of their individual annual attendance (events per year) and their intention to increase or decrease attendance at future events (stated as a percentage, or zero if no change), aggregated over the four countermeasures as described in the previous paragraph.

An average was then calculated across the customers within each of the four venue/event type groups to estimate the average annual increase in number of events attended. For each of the four venue/event types, there is a lower-bound estimate and an upper-bound estimate.

The first sensitivity check uses two different assumptions to represent the number of events attended for customers who selected “two or more events”:

- Lower-bound estimate: “Two or more” = three events
- Upper-bound estimate: “Two or more” = five events

The second sensitivity check uses two different methods of calculating the percentage change in attendance:

- Lower-bound estimate: Percentage change = the maximum percentage change value across all four countermeasures
- Upper-bound estimate: Percentage change = the maximum of either the lower-bound estimate or the sum of the changes across all four countermeasures divided by two

The third sensitivity check uses two different methods for capping percentage change outliers:

- Lower-bound estimate: Percentage change is capped at 100%
- Upper-bound estimate: Percentage change is unaltered

All eight combinations of lower- and upper-bound estimates for the three sensitivity checks were considered to establish lower-bound estimates and upper-bound estimates as follows:

- Lower-bound estimate assumptions: “Two or more”= three; Percentage change (base calculation) = maximum percentage change value across all four countermeasures; Percentage change is capped at 100%

- Upper-bound estimate assumptions: “Two or more”= five; Percentage change (alternative calculation) = maximum (base calculation; sum of changes across all four countermeasures divided by two); Percentage change is unaltered

6.2. Sensitivity Estimates of Changes in Attendance

Table 6-8 presents the results of the sensitivity test to establish both lower-bound and upper-bound estimates for the responses to the survey. The differences in lower- and upper-bound estimates in Table 6-8 are due to the combined effects of all three variations in assumptions described in Section 5.1. For all venues and event types, lower- and upper-bound estimates for total annual events attended is due solely to whether attendance increases of “two or more events” in the past four years is assumed to be three events or five events. Neither of the other two sensitivity factors influence status quo estimates of the total annual events attended for any of the venues and event types.

In contrast, the total annual change in games attended depends on all three of the sensitivity factors. For example, over half (54%) of the 87-game difference between the upper- and lower-bound estimates for increased attendance inside the metro area of the MLB stadium is due primarily to the assumption of whether increased attendance is capped at 100% or not for each respondent. Whether “two or more games” is interpreted to mean three games vs. five games accounts for another 30% of this difference, and whether percent increases across countermeasures are aggregated by assuming the maximum percentage or halving the sum of the percentages accounts for another 14% of the difference. The remaining two percent is due to a synergistic interaction effect among the three factors.

Table 6-8. Lower-Bound and Upper-Bound Estimates of Changes in Attendance

MLB	Inside Metro N=193		Outside Metro N=93	
	Lower-Bound Estimate	Upper-Bound Estimate	Lower-Bound Estimate	Upper-Bound Estimate
Total Annual Games Attended[a]	113.75	179.26	49.75	76.25
Total Annual Change in Games Attended[b]	27.08	113.78	10.32	35.01
Total Change/Total Attended	23.81%	63.47%	20.75%	45.91%
Average Ticket Price	$51.61		$51.45	

[a] Calculated by dividing the total number of events attended by all the respondents (N=193 Inside Metro and N=93 Outside Metro) who visited the venue over the four-year period (2016-2019) by 4.

[b] Represents the total annual change in the number of games attended for all the respondents in the sample.

NHL	Inside Metro N= 130		Outside Metro N=23	
	Lower-Bound Estimate	Upper-Bound Estimate	Lower-Bound Estimate	Upper-Bound Estimate
Total Annual Games Attended[a]	260.00	390.00	45.00	67.00
Total Annual Change in Games Attended[b]	30.32	166.26	3.79	11.74
Total Change/Total Attended	11.66%	42.63%	8.42%	17.52%
Average Ticket Price	$89.46		$94.13	

[a] Calculated by dividing the total number of events attended by all the respondents (N=130 Inside Metro and N=23 Outside Metro) who visited the venue over the four-year period (2016-2019) by 2.5.
[b] Represents the total annual change in the number of games attended for all the respondents in the sample.

NBA	Inside Metro N= 126		Outside Metro N=13	
	Lower-Bound Estimate	Upper-Bound Estimate	Lower-Bound Estimate	Upper-Bound Estimate
Total Annual Games Attended[a]	104.00	157.60	10.80	16.40
Total Annual Change in Games Attended[b]	42.84	194.04	4.95	11.50
Total Change/Total Attended	41.19%	123.12%	45.81%	70.12%
Average Ticket Price	$76.71		$91.92	

[a] Calculated by dividing the total number of events attended by all the respondents (N=126 Inside Metro and N=13 Outside Metro) who visited the venue over the four-year period (2016-2019) by 2.5.
[b] Represents the total annual change in the number of games attended for all the respondents in the sample.

Convention Center	Inside Metro N=153		Outside Metro N=52	
	Lower-Bound Estimate	Upper-Bound Estimate	Lower-Bound Estimate	Upper-Bound Estimate
Total Annual Events Attended[a]	121.50	178.51	32.00	44.50
Total Annual Change in Events Attended[b]	52.05	333.59	19.21	78.05
Total Change/Total Attended	42.84%	186.88%	60.01%	175.38%
Average Ticket Price	$48.59		$58.08	

[a] Calculated by dividing the total number of events attended by all the respondents (N=153 Inside Metro and N=52 Outside Metro) who visited the venue over the four-year period (2016-2019) by 4.
[b] Represents the total annual change in the number of games attended for all the respondents in the sample.

The last estimate, total change/total attended, is a direct input into the I-O model that depends primarily on whether future attendance increases are capped at 100% or not, and to a smaller extent on whether attendance increases are aggregated over countermeasures by assuming the maximum increase or halving the sum of the increases across countermeasures. The assumption of whether "two or more" means three games or five games has no impact on this direct input to the I-O model. For example, for attendance from inside the metro to the MLB venue, there is a difference of nearly 40% between the upper-bound estimate (63.5%) and the lower-bound estimate (23.8%). About 80% of this difference is due to whether attendance increases are capped at 100% or not, and 20% is attributable to how attendance increase responses are aggregated over the four countermeasure enhancements.

6.3. Sensitivity Analysis Results

The effect of the sensitivity tests with respect to percentage changes in likely attendance for the four categories of venues/events are presented in Tables 6-9 to 6-11.

Table 6-9. Changes in Attendance and Ticket Sales due to the Implementation of Countermeasures – Upper-Bound Estimate

Venue	Attendees from the MSA			Attendees from outside the MSA			Total Changes in Ticket Sales (10^6 2018$)
	Change in likelihood of Attendance		Change in Ticket Sales (10^6 2018$)	Change in likelihood of Attendance		Change in Ticket Sales (10^6 2018$)	
	Percent	Amount (10^3)		Percent	Amount (10^3)		
MLB	63.5%	1,285	66.3	45.9%	445	22.9	89.2
NBA	123.1%	722	55.4	70.1%	63	5.8	61.2
NHL	42.6%	290	25.9	17.5%	18	1.7	27.6
MACC	186.9%	3,072	149.3	175.4%	1,267	73.6	222.9

Note: Sample sizes for attendees inside and outside the Metro Area are the same as in Table 6-1.

Table 6-10. Summary Economic Impacts of Increased Attendance at the Four Venue/Event Types on their MSA Regions – Upper-Bound Estimate

	Output (10^6 $)	GDP (10^6 $)	Income (10^6 $)	Employment (# of jobs)
MLB Stadium	249.38	150.31	100.79	2,378
	0.0731%	0.0735%	0.0761%	0.1222%
NBA Arena	32.56	19.91	12.65	310
	0.0064%	0.0074%	0.0078%	0.0122%
NHL Arena	9.59	5.86	3.73	91
	0.0019%	0.0022%	0.0023%	0.0036%
MACC	2,149.18	1,351.84	838.12	18,019
	0.1348%	0.1366%	0.1457%	0.2125%

Notes: Output, GDP, and Income impacts are in millions of 2018$; Employment impacts are in number of jobs; Percentage impacts are with respect to regional baseline levels.

6-11. Comparison of the Economic Impacts Lower-Bound and Upper-Bound Estimates

	Lower-Bound		Upper-Bound	
	GDP (10^6 $)	Employment (# of Jobs)	GDP (10^6 $)	Employment (# of Jobs)
MLB Stadium	68	1,075	150	2,378
NBA Arena	13	202	20	310
NHL Arena	3	44	6	91
MACC	463	6,166	1,352	18,019

Comparing the upper-bound and lower-bound estimates in terms of likely increased attendance in Table 6-11, we note the following: The upper-bound estimates are about three times the size of the lower-bound estimates for the MLB Stadium and the NBA Arena activity, and about four times the size of the lower-bound results for the NHL Arena activity and the Metro Area Convention Center. In terms of the regional economic impacts on GDP, the upper-bound estimates are one-and-a-half times the size of the lower-bound for the NBA games, two times the lower bound for the MLB games and NHL games, and three times the lower bound for the Convention Center activities. The differences between the two sets of upper and lower bounds are due to the fact that spending, other than ticket sales, differs significantly by venue. Recall that people attending convention center events tend to stay for a longer duration than for the other events, for example. They are also likely to come from farther distances.

Note, however, that there are no qualitative changes in the results of the sensitivity analyses. This indicates that, while the estimates in this report have a broad range, they are otherwise generally robust.

7. Conclusion

This chapter has estimated the impacts of terrorism countermeasures on business revenues and macroeconomic indicators for regions in which our three sample public assembly venues reside. The analysis is based on data obtained from the surveys presented in previous chapters, key aspects of which were repeated here.

A major set of inputs into the analysis in this chapter were the tabulations of changes in attendance expressed by survey respondents in relation to the countermeasures, which were significantly positive for all three venues. We then applied these attendance changes to average ticket prices to estimate changes in direct business revenues, which ranged between $30

million (for the NBA/NHL Arena) and $59 million (for the MACC) for the lower-bound estimates. These results follow from the survey, which indicated that many more patrons were more likely to attend the venues because of the presence of countermeasures than those who are unlikely to attend, though the majority of patrons responded that the presence of countermeasures did not make a difference in their likelihood of attending. Note that these direct impacts on business revenues are only one aspect of our estimates because they do not include revenues from concessions and parking; the data did not enable us to separate expenses for these categories at the venue from other spending associated with their visit to the broader venue area.

We then inserted the direct spending on tickets and other purchases associated with the venue activity into a separate regional economic model for each of the venues. The direct purchases ranged from $13 million to $378 million between the three venues for the lower-bound estimates. The differences in the results arise from the fact that ticket prices and length of stay associated with the trips are much greater for the Metropolitan Area Convention Center than they are for the two sports venues. Generally, the total regional economic impacts were approximately twice the size of the direct spending.

We performed sensitivity analyses on key assumptions underlying the calculations in this chapter. Upper-bound estimates were typically three to four times those of lower-bound estimates with respect to ticket sales, and one and one-half to three times the size of lower-bound estimates with respect to regional economic impacts. The sensitivity analyses, however, did not change the results qualitatively, and thus, although our estimates cover a broad range, they are generally robust.

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Chapter 7. Conclusion

Richard John and Adam Rose, Leads

Results from the customer surveys for three different public assembly venues analyzed in the study indicate that commonly utilized security countermeasures are perceived as having substantial efficacy in reducing both crime and terrorism risk. Customer concerns about privacy and inconvenience are reported as relatively minor annoyances compared to the benefits of enhanced safety afforded by increased deployment of the four countermeasures currently in use at the three venues. Nearly all customers indicated that additional countermeasures to bolster security would either increase their attendance at future events at the venue or would not affect their current level of attendance. We detected nearly zero negative spillover impacts from additional utilization of these four countermeasures at the three venues studied.

We summarize the major points of our study as follows:

- The large majority of customers have not noticed and are unaware of actual increased countermeasure deployment.
- Customers overwhelmingly believe that countermeasures are effective and improve safety, particularly with respect to crime.
- A large majority of customers do not view countermeasures as either an inconvenience or an invasion of privacy.
- Deployment of additional security countermeasures does not affect intentions to attend events at the three venues for a large majority (two-thirds to three-quarters) of the customers. For about one-quarter of customers, enhanced countermeasures would increase their likelihood of attending events. Only a small group, less than 3%, indicated a decreased likelihood of attendance associated with increased use of countermeasures.
- There is substantial diversity in customers' willingness to pay for increased security. A substantial group of customers are unwilling to pay anything for large reductions in risks from crime and terrorism. The amount of risk reduction matters in customers' willingness to pay, but not as much as would be expected by their survey responses.
- Customers' willingness to pay is largely insensitive to inconvenience due to wait-time increases and to changes in privacy invasiveness, and it is constant across whether the reduction in risk is for crime or terrorism.
- The willingness to pay for risk reduction is approximately 15 cents per 10 percentage points reduction per person.
- The willingness to pay for a reduction in wait times is approximately 15 cents per five minutes per person, but this effect is sensitive to model assumptions.
- There is no evidence that customers are willing to pay to avoid invasion of privacy concerns.

- Aggregate willingness to pay for security enhancements are likely to be small relative to implementation costs.
- With regard to our best estimate, respondents indicated that the presence of countermeasures is likely, on net, to increase their likelihood of attendance by between 10% and 50%, depending on the venue, with the highest increases associated with NBA games and the Metro Area Convention Center.
- With regard to ticket sales revenue, increased likelihood of attendance due to the presence of countermeasures ranged from $8 million to $59 million, with the largest increase associated with the Metropolitan Area Convention Center.
- With regard to the impact of increased attendance on regional economic activity, our best estimate indicated GDP increases ranging from $3 million to $463 million, with the greatest impact being the host region for the Convention Center.
- Sensitivity tests were performed on key assumptions of the analysis. Upper-bound estimates of regional economic impacts were typically three to four times those of lower-bound estimates with respect to ticket sales, and one-and-a-half to three times the size of lower-bound estimates with respect to regional economic impacts. The sensitivity analyses, however, did not change the results qualitatively, and thus, although our estimates cover a broad range, they are generally robust.

Appendix 1A. Summary of Previous Studies

Author & Date	Study Approach	Site	Respondents	Type	Countermeasure	Objective	Importance of Security
Chan and Lam (2013)	Survey	Hong Kong Hotels	153 Tourists	Tourism	24hr guards; CCTV; Metal detectors; Sniffer dog	Terrorism	68% of guests confirmed that hotel safety and security was important for a hotel purchasing decision
Feickert et al. (2006)	Survey	US Hotels	930 Hotels guests	Tourism	Armed guards; CCTV; Metal detectors	Terrorism	
Law (2006)	Interviews	Hong Kong Tourists/Hotels	1304 Tourists	Tourism	Surveillance Systems or Protection Measures	Terrorism	
Overstreet and Clodfelter (1995)	Interviews	US Malls: 4 Southern states + DC	786 Shoppers	Consumers	CCTV; Parking lot Security Patrols	Crime	18.4% wanted to see more security at malls; Additional security may improve shoppers' feelings of safety and security
Rittichainuwat and Chakraborty (2012)	Survey	Thailand	297 tourists waiting for flights	Tourism	CCTV; Guards; Metal detectors	Terrorism	
Rittichainuwat and Chakraborty (2009)	Survey & Interviews	Thailand	Tourists to Thailand (2004), interviews with Thai hospitality staff	Tourism	CCTV; Metal detectors Vehicle Checks	Terrorism	Paper Concluded: Respondents were more concerned about personal safety than price promotion.
Rose et al. (2014)	Survey & Economic model	US- NYC (Manhattan)	Manhattan Business Community	Business Activity	CCTV random vehicle inspections (RVI)	Terrorism & Crime	
Taylor and Toohey (2006)	Interviews	Australia - Three cities during 2003 Rugby World Cup (RWC)	511 Primary Australians with some international tourists	Sports Tourism	Not specified	Terrorism	.

Taylor and Toohey (2007)	Survey & Interviews	Greece (Athens, Olympia and Thessaloniki) 2004 Summer Olympic venues	Place of residence: Greece 25.3%, North America 12.2%, France 7.6%, United Kingdom 5.8%, Other Europe 20.7%, Australia & NZ 6.5%, Asia 10.9%, South America 4.4%. n=277	Sports Tourism	Not specified	Terrorism	
Toohey et al. (2003)	Survey & Interviews	South Korea	277 Tourists travelling to or within South Korea to attend the 2002 World Cup	Sports Tourism	Not specified	Terrorism	
Yavuz and Welch (2010)	Survey	US - Chicago Transit riders	Transit Riders	Commuters	CCTV Police/Security Personnel	Crime & Disorderly behavior	
Yüksel and Yüksel (2007)	Survey	Southwest Turkey	259 Tourists Shopping	Consumers	N/A	Crime & Disorderly behavior	Perception of high risk environments while shopping was associated with lower customer satisfaction & loyalty intentions. Risks, such as street crime, encountered while shopping would limit activities in the future.

Author & Date	Importance of Perceived Countermeasure Effectiveness	Effect of Security on Patronage	Spillover Effects by Type (invasion of privacy, delay, inconvenience, etc.)	Spillover Effects on Patronage
Chan and Lam (2013)	24hr guards: 4.41 (4th) CCTV: 4.39 (5th) Metal detectors: 3.01 (28th) Sniffer dog: 2.69 (30th)	Knowing how guests perceive system quality can allow hoteliers to achieve a competitive advantage, differentiate themselves from competitors, increase customer loyalty, enhance their corporate image and improve business performance.	Highly visible systems (walkthrough metal detectors and sniffer dogs) may appear to contradict a hotel's primary goal of creating a hospitable and welcoming environment to guests	
Feickert et al. (2006)	Rated on Acceptability Armed Guards: Negatively rated CCTV: Highly rated Metal Detectors: Neutral		Armed Guards/ Metal Detectors: Detract from creation of a hospitable environment & potentially create the impression hotel has had security issues; does not generate guest feelings of safety and security. Metal detectors: Delays, inconvenience	
Law (2006)	Introduction of surveillance systems or protection measures to improve guest confidence if facing terrorist threat (M=3.66)	To attract travelers to visit and to enhance their confidence to travel, tourism planners should implement risk-related measures, such as increasing the transparency of information & introducing surveillance systems		
Overstreet and Clodfelter (1995)	Respondents rating CM as important or very important CCTV: 70.4% Security Patrols: 88.7%	8% (7/785) reported a decline in shopping because of security concerns 23% avoided shopping malls "at least some of the time" because of security concerns		

Rittichainuwat and Chakraborty (2012)	CCTV: Rated one of the least important safety features (>65% rating neutrally or unimportant). Guards: Rated important by 73% and as unimportant by 5% Metal detectors: Rated as important by >50% and unimportant by 15%			
Rittichainuwat and Chakraborty (2009)		Perceived terrorism and disease risk negatively affected the Thai hospitality industry. Instead of offering discounts, hotels recovered tourists by boosting confidence via increasing security measures, such as metal detectors, security cameras and vehicle checks.		
Rose et al. (2014)	CCTV: Improvements in the business environment through perceptions of improved safety against both terrorism and crime		CCTV -- Invasion of Privacy RVI -- Delays, Inconvenience	CCTV: 4.16% increase in direct business activity, equating to an annual direct increase in business sales revenue of $545 million and total GDP increase of $1.1 billion. RVI: Annual direct loss in business revenue of $1.7 billion Total annual (direct plus indirect) GDP loss of $2.9 billion
Taylor and Toohey (2006)		76.6% of respondents saying they felt either "very safe" or "safe". Event attendees who indicate that they felt "very safe" reported more enjoyment than those who merely felt "safe." No evidence that spectators avoided RWC due to terrorism concerns.	Delays, Inconvenience	Feelings of Security measures and enjoyment: 23.8%: Security measures slightly enhanced level of enjoyment 1.9%: Detracted from the event 74.3%: Neutral

Taylor and Toohey (2007)	Rated 'How safe did you feel at the Games?' from 'very safe' (1) to 'unsafe' (5). Overall M = 2.13, Males=2.09, Females =2.26, Local Residents=1.73, Other Greece=1.83, Outside Greece=2.2		Delays, Inconvenience	Respondents were asked to rate the impact of security measures on enjoyment from 'negative impact' (1) to 'positive impact' (5). Overall M=2.96, Female attendees (M= 2.9), Male (M=3.1), Local Greek Residents (M= 3.2) , Other Greek residents (M= 3.1), Outside Greece (M = 2.8)
Toohey et al. (2003)		85% of respondents not worried about security 10% considered not attending because of security concerns. 1% expressed an extremely high level of concern	Delays, Inconvenience	22% -- heightened and obvious level of security enhanced experience. 6% -- security measures detracted from their level of enjoyment.
Yavuz and Welch (2010)	CCTV importance (1-5): Males 3.06 / Females 3.06 Police/Security Personnel (1–5): Males 3.01 / Females 2.99			Measures such as video cameras & police are among significant determinants of perceived risk of crime & social misbehavior. Failure to address perceived risk with increases in security measures can result in fare box losses.

Appendix 2A. Previous CREATE Studies Using Survey Methodologies to Study Risk Perception and Behavior Related to Extreme Events

Baucum, M., R.S. John, M. Mayorga, P. Slovic, W. Burns, K. Portney, and J. Mumpower. 2018. "The dynamics of risk perception for soft target terrorism," *Proceedings of the Probabilistic Safety Assessment and Management (PSAM-14) Bi-Annual Conference.* Los Angeles, Sept. 16-21, 2018. http://psam14.org/proceedings/paper/paper_63_1.pdf

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Appendix 2B. Reference Surveys

Shopping Mall Survey

We are interested in what you think about security measures used for shopping malls in the UNITED STATES. You will be asked to about your experiences with and beliefs about such measures.

Several shopping malls in the United States recently updated their security measures. Below is the list of several security measures that have been implemented or are under consideration.

Please indicate whether you have heard of and/or personally experience any of the following security measures at a shopping malls (select all that apply).

- ☐ Closed-circuit television (CCTV) cameras
- ☐ Uniformed security or law enforcement officers
- ☐ Plain clothes (undercover) security or law enforcement officers
- ☐ Barriers to mitigate high-speed vehicles from plowing into crowds
- ☐ Bomb-sniffing dogs
- ☐ No firearms policy
- ☐ Monitoring for known toxic chemical, biological, and radiological agents
- ☐ Have not heard of or experienced any of these security measures
- ☐ Others (please specify) _____

Several shopping malls have installed additional closed-circuit television cameras on the premises and in the surrounding areas.

Managers of those shopping malls also decided to deploy uniformed and undercover security personnel to observe, detect, intervene, and deter troubling guests.

The managers have also decided to install active barriers to prevent vehicles from approaching crowded places.

In the next section, we ask about your view of each of the security measures described above. There are no right or wrong answers.

What type of commercial facilities are discussed in this study?

- ○ Theme parks
- ○ Sport arenas
- ○ Shopping malls

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at shopping malls in the United States.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce crime.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce crime.	○	○	○	○	○
Reconfiguring traffic flows helps to reduce crime.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at shopping malls in the United States.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
Reconfiguring traffic flows helps to reduce the likelihood of a terrorism event.	○	○	○	○	○

Are you more likely or less likely to come to shopping malls when additional CCTV cameras are installed?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Are you more likely or less likely to come to shopping malls when there are uniformed security personnel?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Are you more likely or less likely to come to shopping malls when traffic flows are re-configured to restrict access to crowded areas around the shopping malls?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Do you think that CCTV cameras increase security and safety at shopping malls?

- ○ Yes
- ○ No

Please check all that you agree with

- ☐ CCTV cameras uses at shopping malls discourage criminals.
- ☐ CCTV camera uses at shopping malls make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- ☐ CCTV camera uses at shopping malls make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- ☐ CCTV camera uses at shopping malls discourage terrorists.
- ☐ CCTV cameras at shopping malls do not increase security and safety.
- ☐ Others, please describe _____

Do you think that uniformed security personnel increases security and safety at shopping malls?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Uniformed security personnel at shopping malls discourage criminals.
- [ ] Uniformed security personnel at shopping malls make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- [ ] Uniformed security personnel at shopping malls make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- [ ] Uniformed security personnel at shopping malls discourage terrorists.
- [ ] Uniformed security personnel at shopping malls do not increase security and safety.
- [ ] Others, please describe _____

Do you think that undercover security personnel surveilling patrons increases security and safety at shopping malls?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Undercover security personnel at shopping malls discourage criminals.
- [ ] Undercover security personnel at shopping malls make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- [ ] Undercover security personnel at shopping malls make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- [ ] Undercover security personnel at shopping malls discourage terrorists.
- [ ] Undercover security personnel at shopping malls do not increase security and safety.
- [ ] Others, please describe _____

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at shopping malls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of CCTV cameras at shopping malls.	○	○	○	○	○
CCTV cameras make my visits to shopping malls less enjoyable.	○	○	○	○	○
CCTV cameras at shopping malls invades my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at shopping malls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of uniformed security personnel at shopping malls.	○	○	○	○	○
Uniformed security personnel at shopping malls make my visits less enjoyable.	○	○	○	○	○
Uniformed security personnel make it less convenient to spend time at shopping malls.	○	○	○	○	○
Uniformed security personnel at shopping malls invade my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at shopping malls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of undercover security personnel at shopping malls.	○	○	○	○	○
Undercover security personnel make my visits to shopping malls less enjoyable.	○	○	○	○	○
Undercover security personnel makes it less convenient to spend time at shopping malls.	○	○	○	○	○
Undercover security personnel at shopping malls invade my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at shopping malls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of the use of barriers restricting traffic from crowded locations near shopping malls.	○	○	○	○	○
The use of barriers restricting traffic from crowded locations near shopping malls makes my visit less enjoyable.	○	○	○	○	○
The use of barriers restricting traffic from crowded locations makes it less convenient to spend time at shopping malls.	○	○	○	○	○

In this section, we are interested in your personal concerns about possible side-effects related to the installation of a new countermeasure at shopping malls.

While increasing public safety at shopping malls is one of the top priorities for facility owners/managers, there are unintended side-effects when new security measures are implemented.

For example, new security measures often come with additional business expenses. Thus, patrons may have to pay more for their goods and services.

Use of CCTV cameras to surveil and monitor patrons' behaviors may be considered privacy intrusions by some patrons.

Barriers to block vehicles from entering places where there could be large crowds could cause great inconvenience by creating traffic jams and decreasing available parking near the shopping

mall.

Would you be willing to pay an extra $1 for every $20 dollars spent at a mall to implement more effective security that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to pay an extra $100 for every $20 dollars spent at a mall to implement more effective security that would increase detection of weapons from 1 patron out of 10 carrying weapons to 8 patrons out of 10 carrying weapons? Few people would be willing to pay

that much. Indeed, this is an attention check question. Please answer "No"

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to walk extra 5 minutes from the parking lot to the mall entrance to implement more effective security that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

How many times did you shop at a shopping mall in the last three months?

- ○ None
- ○ Fewer than three
- ○ Between four and six times
- ○ Between six and twelve times
- ○ More than twelve times

How many times did you eat out at one of the restaurants in a shopping mall in the last three months?

- ○ None
- ○ Fewer than three
- ○ Between four and six times

- ○ Between six and twelve times
- ○ More than twelve times

How many times did you go to a cinema at a shopping mall in the last three months?

- ○ None
- ○ Fewer than three
- ○ Between four and six times
- ○ Between six and twelve times
- ○ More than twelve times

Stadium Survey

We are interested in what you think about security measures used for STADIUMS in the UNITED STATES. You will be asked to about your experiences with and beliefs about such measures.

Many stadiums across America have recently updated their security measures. Below is the list of several security measures that have been implemented or under consideration.

Please indicate whether you have heard of and/or personally experience any of the following security measures (select all that apply).

- ☐ Closed-circuit television (CCTV) cameras
- ☐ Presence of uniformed security or law enforcement officers
- ☐ Presence of plain clothes (undercover) security or law enforcement officers
- ☐ Barriers to mitigate high-speed vehicles from plowing into crowds
- ☐ Bomb sniffing dogs
- ☐ Walk-through metal detectors
- ☐ Handheld metal detectors for secondary screening on randomly selected guests
- ☐ Person-borne explosive detection dogs for all major events
- ☐ No firearms policy
- ☐ Bag inspection
- ☐ Fully uniformed tactical SWAT personnel in four-man teams assigned areas of responsibility outside the main entrances
- ☐ Monitoring for known toxic chemical, biological, and radiological agents
- ☐ Others (please specify) _____
- ☐ Have not heard of or experienced any of these security measures

A number of security measures could be implemented at stadiums across America. For example, a number of NFL stadiums have installed additional closed-circuit television cameras on the premises and in the surrounding areas.

Many stadiums also require patrons to undergo a metal detector screening when entering the venues. Security personnel may also use a handheld device to conduct a secondary screening on selected patrons.

Managers of several stadiums also deploy uniformed and undercover security personnel to observe, detect, intervene, and deter troubling guests.

Many stadiums also install active barriers to prevent vehicles from approaching crowded places.

In the next section, we ask about your view of each of the stadium security measures described above. There are no right or wrong answers. Please focus on each security measure as used for stadiums only.

What type of commercial facility is discussed in this study?

- ○ Stadiums
- ○ Shopping malls
- ○ Theme park

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce crime.	○	○	○	○	○
The application of security screening helps to reduce crime.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce crime.	○	○	○	○	○
Reconfiguring traffic flows helps to reduce crime.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
The application of security screening helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
Reconfiguring traffic flows helps to reduce the likelihood of a terrorism event.	○	○	○	○	○

Are you more likely or less likely to attend events at stadiums when additional CCTV cameras are installed?

○ Less likely

○ Remain the same

○ More likely

Are you more likely or less likely to attend events at stadiums when metal detector screenings are used at all entries?

○ Less likely

- ○ Remain the same
- ○ More likely

Are you more likely or less likely to attend events at stadiums when there are uniformed security personnel?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Are you more likely or less likely to attend events at stadiums when traffic flows are re-configured to restrict access to crowded areas around the stadium?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Do you think that CCTV cameras at stadiums increase security and safety at stadium events?

- ○ Yes
- ○ No

Please check all that you agree with

- ☐ CCTV cameras at stadiums discourage criminals
- ☐ CCTV camera uses at stadiums make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack
- ☐ CCTV camera uses at stadiums make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack
- ☐ CCTV camera uses at stadiums discourage terrorists
- ☐ CCTV cameras at stadiums do not increase security and safety
- ☐ Others, please describe _____

Do you think that security screening at entrances increases security and safety at stadiums?

- ○ Yes
- ○ No

Please check all that you agree with.

- ☐ Security screenings at stadiums discourage criminals
- ☐ Security screenings at stadiums make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack
- ☐ Security screenings at stadiums make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack
- ☐ Security screenings at stadiums discourage terrorists
- ☐ Security screenings at stadiums do not increase security and safety
- ☐ Others, please describe _____

Do you think that uniformed security personnel at stadiums increases security and safety at stadiums?

- ○ Yes
- ○ No

Please check all that you agree with.

- ☐ Uniformed security personnel at stadiums discourage criminals
- ☐ Uniformed security personnel at stadiums make it easier to stop criminals and terrorists before they commit crimes or carry out an attack
- ☐ Uniformed security personnel at stadiums make it easier to identify and arrest criminals and terrorists after they commit a crime or carry out an attack

- [ ] Uniformed security personnel at stadiums discourage terrorists
- [ ] Uniformed security personnel at stadiums do not increase security and safety
- [ ] Others, please describe _____

Do you think that undercover security personnel surveilling patrons increases security and safety at stadiums?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Undercover security personnel at stadiums discourage criminals
- [ ] Undercover security personnel at stadiums make it easier to stop criminals and terrorists before they commit crimes or carry out an attack
- [ ] Undercover security personnel at stadiums make it easier to identify and arrest criminals and terrorists after they commit a crime or carry out an attack
- [ ] Undercover security personnel at stadiums discourage terrorists
- [ ] Undercover security personnel at stadiums do not increase security and safety
- [ ] Others, please describe _____

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of CCTV cameras at stadiums	○	○	○	○	○
CCTV cameras make my visits to stadiums less enjoyable	○	○	○	○	○
CCTV cameras at stadiums invades my privacy	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of uniformed security personnel at stadiums	○	○	○	○	○
Uniformed security personnel at stadiums make my visits less enjoyable	○	○	○	○	○
Uniformed security personnel make it less convenient to attend stadium events	○	○	○	○	○
Uniformed security personnel at stadiums invade my privacy	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of undercover security personnel at stadiums	○	○	○	○	○
Undercover security personnel make my visits to stadiums less enjoyable	○	○	○	○	○
Undercover security personnel at stadiums make it less convenient to attend an event	○	○	○	○	○
Undercover security personnel invade my privacy	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of security screening	○	○	○	○	○
Security screening makes my visits less enjoyable	○	○	○	○	○
Security screening makes it less convenient to attend an event in a stadium	○	○	○	○	○
Security screening invades my privacy	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements as used for stadium security.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of the use of barriers restricting traffic from crowded locations near stadiums	○	○	○	○	○
The use of barriers restricting traffic from crowded locations near stadiums makes my visit less enjoyable	○	○	○	○	○
The use of barriers restricting traffic from crowded locations near stadiums makes it less convenient to attend an event in the stadium	○	○	○	○	○

In this section, we are interested in your personal concerns about possible side effects related to the installation of a new countermeasure at American stadiums.

Indeed, while increasing public safety at stadiums is one of the top priorities for facility owners/managers, there are unintended side effects when new security measures are implemented.

For example, new security measures often come with additional business expenses. Thus, patrons may have to pay more for their tickets and/or goods and services offered by the venue.

Use of CCTV cameras to surveil and monitor patrons' behaviors and use of metal detectors are used for screening may be considered privacy intrusions by some patrons.

Barriers to block vehicles from entering places where there could be large crowds could cause great inconvenience by creating traffic jams and decreasing available parking near the stadium.

Would you be willing to pay an extra $10 for an entrance ticket to implement more effective security that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to pay an extra $1000 for a ticket to implement more effective security that would increase detection of weapons from 1 visitor out of 10 carrying weapons to 8 visitors out of 10 carrying weapons? Few people would be willing to pay that much. Indeed, this is an attention check question. Please answer "No"

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to wait an extra 10 minutes in a security screening line to implement a more effective security screening that would increase detection of weapons from 1 patron out

of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

Please indicate yes/no answers to the following questions

	Yes	No
Have you attended at least one sporting event hosted in a stadium in the U.S during the last 12 months?	○	○
Have you attended at least one concert hosted in a stadium in the U.S during the last 12 months?	○	○
Have you attended at least one special event (e.g. religious events, civic events, job fairs, etc) hosted in a stadium in the U.S during the last 12 months?	○	○

How many times have you attended a sporting event (football, baseball, soccer, etc) in a stadium in the U.S. in the last 12 months?

_____

How many times have you attended a concert in a stadium in the U.S. in the last 12 months? Type 'NA" if this is not applicable.

_____

How many times have you attended a special event (e.g. religious gathering, job fair, civic event, etc) in a stadium in the U.S. in the last 12 months? Type 'NA" if this is not applicable.

_____

Concert Hall Survey

We are interested in what you think about security measures used for concert halls in the UNITED STATES. You will be asked to about your experiences with and beliefs about such measures.

Several concert halls in the United States recently updated their security measures. Below is the list of several security measures that have been implemented or are under consideration.

Please indicate whether you have heard of and/or personally experience any of the following security measures at a concert hall (select all that apply).

- ☐ Closed-circuit television (CCTV) cameras
- ☐ Uniformed security or law enforcement officers
- ☐ Plain clothes (undercover) security or law enforcement officers
- ☐ Barriers to mitigate high-speed vehicles from plowing into crowds
- ☐ Bomb-sniffing dogs
- ☐ Walk-through metal detectors
- ☐ Handheld metal detectors for secondary screening on randomly selected guests
- ☐ No firearms policy
- ☐ Bag inspection
- ☐ Monitoring for known toxic chemical, biological, and radiological agents
- ☐ Other: (Please specify) _____
- ☐ Have not heard of or experienced any of these security measures

Several concert halls have installed additional closed-circuit television cameras on the premises and in the surrounding areas.

Managers of those concert halls also decided to deploy uniformed and undercover security personnel to observe, detect, intervene, and deter troubling guests.

Many concert halls also install active barriers to prevent vehicles from approaching crowded places.

In the next section, we ask about your view of each of the security measures described above. There are no right or wrong answers.

What type of commercial facilities are discussed in this study?

- ○ Convention Centers
- ○ Concert Halls
- ○ Shopping Malls

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls in the United States

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce crime.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce crime.	○	○	○	○	○
Reconfiguring traffic flows helps to reduce crime.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls in the United States.

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce the likelihood of a terrorism event	○	○	○	○	○
Reconfiguring traffic flows helps to reduce the likelihood of a terrorism event.	○	○	○	○	○

Are you more likely or less likely to come to concert halls when additional CCTV cameras are installed?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Are you more likely or less likely to come to concert halls when there are uniformed security personnel?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Are you more likely or less likely to come to concert halls when traffic flows are re-configured to restrict access to crowded areas around the concert halls?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Do you think that CCTV cameras increase security and safety at concert halls?

- ○ Yes
- ○ No

Please check all that you agree with

- ☐ CCTV cameras uses at concert halls discourage criminals.
- ☐ CCTV camera uses at concert halls make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- ☐ CCTV camera uses at concert halls make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- ☐ CCTV camera uses at concert halls discourage terrorists.
- ☐ CCTV cameras at concert halls do not increase security and safety.
- ☐ Others, please describe _____

Do you think that uniformed security personnel increases security and safety at concert halls?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Uniformed security personnel at concert halls discourage criminals.
- [ ] Uniformed security personnel at concert halls make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- [ ] Uniformed security personnel at concert halls make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- [ ] Uniformed security personnel at concert halls discourage terrorists.
- [ ] Uniformed security personnel at concert halls do not increase security and safety.
- [ ] Others, please describe _____

Do you think that undercover security personnel surveilling patrons increases security and safety at concert halls?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Undercover security personnel at concert halls discourage criminals.
- [ ] Undercover security personnel at concert halls make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- [ ] Undercover security personnel at concert halls make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- [ ] Undercover security personnel at concert halls discourage terrorists.
- [ ] Undercover security personnel at concert halls do not increase security and safety.
- [ ] Others, please describe _____

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of CCTV cameras at concert halls.	○	○	○	○	○
CCTV cameras make my visits to concert halls less enjoyable.	○	○	○	○	○
CCTV cameras at concert halls invades my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of uniformed security personnel at concert halls.	○	○	○	○	○
Uniformed security personnel at concert halls make my visits less enjoyable.	○	○	○	○	○
Uniformed security personnel make it less convenient to spend time at concert halls.	○	○	○	○	○
Uniformed security personnel at concert halls invade my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of undercover security personnel at concert halls.	○	○	○	○	○
Undercover security personnel make my visits to concert halls less enjoyable.	○	○	○	○	○
Undercover security personnel makes it less convenient to spend time at concert halls.	○	○	○	○	○
Undercover security personnel at concert halls invade my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of the use of barriers restricting traffic from crowded locations near concert halls.	○	○	○	○	○
The use of barriers restricting traffic from crowded locations near concert halls makes my visit less enjoyable.	○	○	○	○	○
The use of barriers restricting traffic from crowded locations makes it less convenient to spend time at concert halls.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at concert halls.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of bag checks at the entrances to concert halls.	○	○	○	○	○
Back checks at concert hall entrances make my visits less enjoyable.	○	○	○	○	○
Bag checks make it less convenient to attend concert halls.	○	○	○	○	○

In this section, we are interested in your personal concerns about possible side-effects related to the installation of a new countermeasure at concert halls.

While increasing public safety at concert halls is one of the top priorities for facility owners/managers, there are unintended side-effects when new security measures are implemented.

For example, new security measures often come with additional business expenses. Thus, patrons may have to pay more for their goods and services.

Use of CCTV cameras to surveil and monitor patrons' behaviors may be considered privacy intrusions by some patrons.

Barriers to block vehicles from entering places where there could be large crowds could cause great inconvenience by creating traffic jams and decreasing available parking near the concert halls.

Would you be willing to pay an extra $10 for an entrance ticket to implement more effective security that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to pay an extra $1000 for a ticket to implement more effective security that would increase detection of weapons from 1 visitor out of 10 carrying weapons to 8

visitors out of 10 carrying weapons? Few people would be willing to pay that much. Indeed, this is an attention check question. Please answer "No"

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to wait an extra 10 minutes in a security screening line to implement a more effective security screening that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

How many times have you attended an event at an indoor concert hall in the past 12 months?

_____

Convention Center Survey

We are interested in what you think about security measures used for convention centers in the UNITED STATES. You will be asked to about your experiences with and beliefs about such measures.

Several convention centers in the United States recently updated their security measures. Below is the list of several security measures that have been implemented or are under consideration.

Please indicate whether you have heard of and/or personally experience any of the following security measures at a convention center (select all that apply).

- ☐ Closed-circuit television (CCTV) cameras
- ☐ Uniformed security or law enforcement officers
- ☐ Plain clothes (undercover) security or law enforcement officers
- ☐ Barriers to mitigate high-speed vehicles from plowing into crowds
- ☐ Bomb-sniffing dogs
- ☐ Walk-through metal detectors
- ☐ Handheld metal detectors for secondary screening on randomly selected guests
- ☐ No firearms policy
- ☐ Bag inspection
- ☐ Monitoring for known toxic chemical, biological, and radiological agents
- ☐ Other: (Please specify) _____
- ☐ Have not heard of or experienced any of these security measures

Several convention centers have installed additional closed-circuit television cameras on the premises and in the surrounding areas.

Managers of those convention centers also decided to deploy uniformed and undercover security personnel to observe, detect, intervene, and deter troubling guests.

Many convention centers also install active barriers to prevent vehicles from approaching crowded places.

In the next section, we ask about your view of each of the security measures described above. There are no right or wrong answers.

What type of commercial facilities are discussed in this study?

- ○ Convention Centers
- ○ Concert Halls
- ○ Shopping Malls

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers in the United States

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce crime.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce crime.	○	○	○	○	○
Reconfiguring traffic flows helps to reduce crime.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers in the United States.

	Strongly Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The installation of CCTV cameras helps to reduce the likelihood of a terrorism event.	○	○	○	○	○
The deployment of uniformed and undercover security personnel helps to reduce the likelihood of a terrorism event	○	○	○	○	○
Reconfiguring traffic flows helps to reduce the likelihood of a terrorism event.	○	○	○	○	○

Are you more likely or less likely to come to convention centers when additional CCTV cameras are installed?

○ Less likely

○ Remain the same

○ More likely

Are you more likely or less likely to come to convention centers when there are uniformed security personnel?

○ Less likely

○ Remain the same

○ More likely

Are you more likely or less likely to come to convention centers when traffic flows are re-configured to restrict access to crowded areas around the concert halls?

- ○ Less likely
- ○ Remain the same
- ○ More likely

Do you think that CCTV cameras increase security and safety at convention centers?

- ○ Yes
- ○ No

Please check all that you agree with

- ☐ CCTV cameras uses at convention centers discourage criminals.
- ☐ CCTV camera uses at convention centers make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- ☐ CCTV camera uses at convention centers make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- ☐ CCTV camera uses at convention centers discourage terrorists.
- ☐ CCTV cameras at convention centers do not increase security and safety.
- ☐ Others, please describe _____

Do you think that uniformed security personnel increases security and safety at convention centers?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Uniformed security personnel at convention centers discourage criminals.
- [ ] Uniformed security personnel at convention centers make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- [ ] Uniformed security personnel at convention centers make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- [ ] Uniformed security personnel at convention centers discourage terrorists.
- [ ] Uniformed security personnel at convention centers do not increase security and safety.
- [ ] Others, please describe _____

Do you think that undercover security personnel surveilling patrons increases security and safety at convention centers?

- ○ Yes
- ○ No

Please check all that you agree with.

- [ ] Undercover security personnel at convention centers discourage criminals.
- [ ] Undercover security personnel at convention centers make it easier to stop criminals and terrorists BEFORE they commit crimes or carry out an attack.
- [ ] Undercover security personnel at convention centers make it easier to identify and arrest criminals and terrorists AFTER they commit a crime or carry out an attack.
- [ ] Undercover security personnel at convention centers discourage terrorists.
- [ ] Undercover security personnel at convention centers do not increase security and safety.

☐ Others, please describe _____

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of CCTV cameras at convention centers.	○	○	○	○	○
CCTV cameras make my visits to convention centers less enjoyable.	○	○	○	○	○
CCTV cameras at convention centers invades my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of uniformed security personnel at convention centers.	○	○	○	○	○
Uniformed security personnel at convention centers make my visits less enjoyable.	○	○	○	○	○
Uniformed security personnel make it less convenient to spend time at convention centers.	○	○	○	○	○
Uniformed security personnel at convention centers invade my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of undercover security personnel at convention centers.	○	○	○	○	○
Undercover security personnel make my visits to convention centers less enjoyable.	○	○	○	○	○
Undercover security personnel make it less convenient to spend time at convention centers.	○	○	○	○	○
Undercover security personnel at convention centers invade my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of the use of barriers restricting traffic from crowded locations near convention centers.	○	○	○	○	○
The use of barriers restricting traffic from crowded locations near convention centers makes my visit less enjoyable.	○	○	○	○	○
The use of barriers restricting traffic from crowded locations makes it less convenient to spend time at convention centers.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the security procedures at convention centers.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel safer because of bag checks at the entrances to convention centers.	○	○	○	○	○
Back checks at convention centers entrances make my visits less enjoyable.	○	○	○	○	○
Bag checks make it less convenient to attend convention centers.	○	○	○	○	○

In this section, we are interested in your personal concerns about possible side-effects related to the installation of a new countermeasure at convention centers.

While increasing public safety at convention centers is one of the top priorities for facility owners/managers, there are unintended side-effects when new security measures are implemented.

For example, new security measures often come with additional business expenses. Thus, patrons may have to pay more for their goods and services.

Use of CCTV cameras to surveil and monitor patrons' behaviors may be considered privacy intrusions by some patrons.

Barriers to block vehicles from entering places where there could be large crowds could cause great inconvenience by creating traffic jams and decreasing available parking near the convention centers.

Would you be willing to pay an extra $10 for an entrance ticket to implement more effective security that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to pay an extra $1000 for a ticket to implement more effective security that would increase detection of weapons from 1 visitor out of 10 carrying weapons to 8

visitors out of 10 carrying weapons? Few people would be willing to pay that much. Indeed, this is an attention check question. Please answer "No"

- ○ Yes
- ○ Indifferent
- ○ No

Would you be willing to wait an extra 10 minutes in a security screening line to implement a more effective security screening that would increase detection of weapons from 1 patron out of 10 carrying weapons to 5 patrons out of 10 carrying weapons?

- ○ Yes
- ○ Indifferent
- ○ No

How many times have you attended an event at a convention center in the past 12 months?

_____

Demographic Questions (Identical for all Surveys)

What year were you born?

▼ 2000 ... 1921

What is the highest level of school you have completed or the highest degree you have received?

- ○ Less than high school diploma
- ○ High school graduate (high school diploma or equivalent including GED)
- ○ Some college but no degree
- ○ Associate degree in college (2-year)
- ○ Bachelor's degree in college (4-year)
- ○ Master's degree
- ○ Professional degree (MBA, MPH, JD, MD)
- ○ Doctoral degree

Choose one or more races that you consider yourself to be:

- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Hispanic or Latino

What is your gender?

- ○ Male
- ○ Female

Do you identify as transgender?

- ○ Yes
- ○ No
- ○ Prefer not to answer

Would you please give your best estimate of your typical annual household annual gross income (including any government assistance and before taxes or other deductions) in the past few years?

- ○ Less than $10,000
- ○ $10,000 to $19,999
- ○ $20,000 to $29,999
- ○ $30,000 to $39,999
- ○ $40,000 to $49,999
- ○ $50,000 to $59,999
- ○ $60,000 to $69,999
- ○ $70,000 to $79,999
- ○ $80,000 to $89,999
- ○ $90,000 to $99,999
- ○ $100,000 to $149,999
- ○ $150,000 or more

What is the zip code of the residence you have lived in the last 12 months?

Appendix 3A. Customer Survey - Generic

University of Southern California

Department of Psychology and CREATE

INFORMATION/FACTS SHEET FOR EXEMPT NON-MEDICAL RESEARCH

Perceptions of Security Measures at the [Venue]. You are invited to participate in a research study about security measures at the [Venue] in the United States. This document provides information about this study. You must be 18 or older to participate, and your participation is voluntary. Please take as much time as you need to read this information sheet, and feel free to print it for your records.

You will be asked to provide information about your experiences and views of security measures, and how they impact your decision to visit and spend time at convention centers. You will also be asked to indicate your sex, age, race, and income as background factors. This survey is anticipated to take no more than 30 minutes to complete. However, we expect that most people will finish it more quickly.

There are no anticipated risks to your participation in this study. You can take as many breaks as needed, as well as discontinue your participation at any time for any reason.

There will be no information obtained in connection with this survey that can identify you. Your name, address or other information that may identify you will not be linked to your responses. Only the members of the research team, the funding agency (the U.S. Department of Homeland Security) and the University of Southern California's Human Subjects Protection Program (HSPP) may access the data. The HSPP reviews and monitors research studies to protect the rights and welfare of research subjects. The data will be stored indefinitely on password protected researcher computers in a locked room. In addition, the data files themselves also will be password protected. The anonymous data may be used for future research. If you do not want your data used in future studies, you should not participate.

Investigator Contact Information: If you have any comments, concerns, or questions regarding the conduct of this research please contact Richard John via email at richardj@usc.edu.

IRB Contact Information: If you have questions, concerns, or complaints about your rights as a research participant or the research in general and are unable to reach the research team, or if you want to talk to someone independent of the research team, please contact the University Park Institutional Review Board (UPIRB), Credit Union Building (CUB), Third Floor #310, Los

Angeles, CA 90089-0702; via phone at (213) 821-5272, Fax at (213) 821-5276 or e-mail at upirb@usc.edu.

If you consent, click to continue

Did you attend an event at the [Venue] before [Date]?

- ○ Yes
- ○ No

Approximately how many times did you attend the events listed at the [Venue] before [Date] ?

	0	1	2 or more
[Event type]	○	○	○
[Event type]	○	○	○
[Event type]	○	○	○

Did you think about attending an event at the [Venue] before [Date]?

- ○ Yes
- ○ No

Have you attended an event at the [Venue] since [Date]?

- ○ Yes
- ○ No

Approximately how many times did you attend the events listed at the [Venue] after [Date]?

	0	1	2 or more
[Event type]	○	○	○
[Event type]	○	○	○
[Event type]	○	○	○

Have you thought about attending an event at the [Venue] since [Date]?

- ○ Yes
- ○ No

Would you say the typical price you paid for a single day's admission to the [Venue] (including online purchasing fees but not including parking and concessions at the event) was

- ○ Free ($0)
- ○ $1 to $20
- ○ $21 to $50
- ○ $51 to $100
- ○ $101 to $250
- ○ More than $250

Would you say the typical wait time to pass-through the security screening only (e.g., metal detectors, purse and bag checks) to enter events that you attended at the [Venue] was

- ○ No wait
- ○ 1 - 5 minutes
- ○ 6 - 10 minutes
- ○ 11 - 19 minutes
- ○ 20 - 29 minutes
- ○ 30 - 39 minutes
- ○ 40 minutes or more

To complete the screening for this survey, you will be asked about your familiarity with some of the security measures in place at the [Venue]. Each of these security measures is briefly defined as follows:

Video cameras: Refers to the use of cameras to record events that happen at the [Venue] for security & surveillance purposes. Commonly referred to as Closed-Circuit Television (CCTV).

Security guards: Refers to the use of uniformed guards (not police officers) employed to patrol the [Venue] and monitor events that happen.

Metal detectors: Refers to the use of metal detectors at the entrances to the [Venue], to screen guests as they arrive at the venue.

Bag checks: Refers to the routine inspection of guests' bags (such as handbags or backpacks) at the entrances to the [Venue]. These inspections can be manually performed by security personnel, or with X-ray screening.

Over the past few years, have you learned of any significant increases in [Venue]'s use of **video cameras** for security purposes?

- ○ Yes, I have noticed [Venue]'s increase in video cameras use during one of my visits there.
- ○ Yes, I have heard about [Venue] increasing their use of video cameras, though have not experienced it firsthand.
- ○ I am not aware of [Venue] increasing their use of video cameras for security purposes

Over the past few years, have you learned of any significant increases in [Venue]'s use of **security guards**?

- ○ Yes, I have noticed [Venue]'s increase in security guard use during one of my visits there.
- ○ Yes, I have heard about [Venue] increasing their use of security guards, though have not experienced it firsthand.
- ○ I am not aware of [Venue] increasing their use of security guards

Over the past few years, have you learned of any significant increases in [Venue]'s use of **metal detectors** for security purposes?

- ○ Yes, I have noticed [Venue]'s increase in metal detector use during one of my visits there.
- ○ Yes, I have heard about [Venue] increasing their use of metal detectors, though have not experienced it firsthand.
- ○ I am not aware of [Venue] increasing their use of metal detectors

Over the past few years, have you learned of any significant increases in [Venue]'s use of **bag checks**?

- ○ Yes, I have noticed [Venue]'s increase in bag checks during one of my visits there.
- ○ Yes, I have heard about [Venue] increasing their use of bag checks, though have not experienced it firsthand.
- ○ I am not aware of [Venue] increasing their use of bag checks

Please indicate how much you agree (or disagree) with the following statements regarding the [Venue]'s increased use of the following countermeasures over the past few years:

Increased use of **video cameras** has helped reduce crime at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **security guards** has helped reduce crime at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **metal detectors** has helped reduce crime at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **bag checks** has helped reduce crime at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **video cameras** has helped reduce the likelihood of a terrorism event at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **security guards** has helped reduce the likelihood of a terrorism event at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **metal detectors** has helped reduce the likelihood of a terrorism event at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Increased use of **bag checks** has helped reduce the likelihood of a terrorism event at the [Venue].

- ○ Strongly disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Somewhat agree
- ○ Strongly agree

Do you think that the [Venue]'s increased use of **video cameras** has increased its overall safety and security?

- ○ Yes
- ○ No
- ○

Please check all that you agree with

- ☐ The increased use of video cameras at the [Venue] has made it easier to identify and arrest **terrorists** AFTER they commit a crime or carry out an attack.
- ☐ The increased use of video cameras at the [Venue] has made it easier to identify and arrest **criminals** AFTER they commit an assault or robbery.
- ☐ The increased use of video cameras at the [Venue] has made it easier to stop **terrorists** BEFORE they commit crimes or carry out an attack.
- ☐ The increased use of video cameras at the [Venue] has made it easier to stop **criminals** BEFORE they commit an assault or robbery.
- ☐ None of the above

Do you think that the [Venue]'s increased use of **security guards** has increased its overall safety and security?

- ○ Yes
- ○ No

Please check all that you agree with

☐ The increased use of security guards at the [Venue] has made it easier to identify and arrest **terrorists** AFTER they commit a crime or carry out an attack.

☐ The increased use of security guards at the [Venue] has made it easier to identify and arrest **criminals** AFTER they commit an assault or robbery.

☐ The increased use of security guards at the [Venue] has made it easier to stop **terrorists** BEFORE they commit crimes or carry out an attack.

☐ The increased use of security guards at the [Venue] has made it easier to stop **criminals** BEFORE they commit an assault or robbery.

☐ None of the above

Do you think that the [Venue]'s increased use of **metal detectors** has increased its overall safety and security?

○ Yes

○ No

Please check all that you agree with

- [ ] The increased use of metal detectors at the [Venue] has made it easier to stop **terrorists** BEFORE they commit crimes or carry out an attack.
- [ ] The increased use of metal detectors at the [Venue] has made it easier to stop **criminals** BEFORE they commit an assault or robbery.
- [ ] None of the above

Do you think that the [Venue]'s increased use of **bag checks** has increased its overall safety and security?

- ○ Yes
- ○ No

Please check all that you agree with

- [ ] The increased use of bag checks at the [Venue] has made it easier to stop **terrorists** BEFORE they commit crimes or carry out an attack.
- [ ] The increased use of bag checks at the [Venue] has made it easier to stop **criminals** BEFORE they commit an assault or robbery.
- [ ] None of the above

Since the [Venue] increased its use of **video cameras** used for surveillance, has that affected your likelihood of attending [Venue]?

- ○ Decreased my likelihood of attending
- ○ No change in my likelihood of attending
- ○ Increased my likelihood of attending

Since the [Venue] increased its use of **video cameras** used for surveillance, how much has it increased your likelihood of attending [Venue]?

For example, if you would have attended 3 events but now you would attend 6 events, that is an increase of 100%.

- ○ Increased my likelihood of attending by up to 100%
- ○ Increased my likelihood of attending by more than 100%

Since the [Venue] increased their use of **video cameras** used for surveillance, what percent has your likelihood of attending [Venue] decreased by?

For example, if you would have attended 4 events but now you would only attend 2, that is a decrease of 50%.

- 100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0

Likelihood of attending (%)	

Since the [Venue] increased its use of **video cameras** used for surveillance, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 6, that is an increase of 50%.

0 10 20 30 40 50 60 70 80 90 100

Likelihood of attending (%)	

Since the [Venue] increased its use of **video cameras** used for surveillance, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 12, that is an increase of 200%.

	100	200	300	400	500
Likelihood of attending (%)					

Since the [Venue] increased its use of **security guards** used for surveillance, has that affected your likelihood of attending [Venue]?

- ○ Decreased my likelihood of attending
- ○ No change in my likelihood of attending
- ○ Increased my likelihood of attending

Since the [Venue] increased its use of **security guards** used for surveillance, how much has it increased your likelihood of attending [Venue]?

For example, if you would have attended 3 events but now you would attend 6 events, that is an increase of 100%.

- ○ Increased my likelihood of attending by up to 100%
- ○ Increased my likelihood of attending by more than 100%

Since the [Venue] increased its use of **security guards** used for surveillance, what percent has your likelihood of attending [Venue] decreased by?

For example, if you would have attended 4 events but now you would only attend 2, that is a decrease of 50%.

-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0

Likelihood of attending (%)	

Since [Venue] increased its use of **security guards** used for surveillance, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 6, that is an increase of 50%.

More than 100% increase

0 10 20 30 40 50 60 70 80 90 100

Likelihood of attending (%)	

Since the [Venue] increased its use of **security guards** used for surveillance, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 12, that is an increase of 200%.

100 200 300 400 500

Likelihood of attending (%)	

Since the [Venue] increased its use of **metal detectors**, has that affected your likelihood of attending [Venue]?

- ○ Decreased my likelihood of attending
- ○ No change in my likelihood of attending
- ○ Increased my likelihood of attending

Since the [Venue] increased its use of **metal detectors** used for surveillance, how much has it increased your likelihood of attending [Venue]?

For example, if you would have attended 3 events but now you would attend 6 events, that is an increase of 100%.

- ○ Increased my likelihood of attending by up to 100%
- ○ Increased my likelihood of attending by more than 100%

Since the [Venue] increased its use of **metal detectors**, what percent has your likelihood of attending [Venue] decreased by?

For example, if you would have attended 4 events but now you would only attend 2, that is a decrease of 50%.

-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0

Likelihood of attending (%)	

Since the [Venue] increased its use of **metal detectors**, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 6, that is an increase of 50%.

More than 100% increase

0 10 20 30 40 50 60 70 80 90 100

Likelihood of attending (%)	

Since the [Venue] increased its use of **metal detectors** used for surveillance, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 12, that is an increase of 200%.

100 200 300 400 500

Likelihood of attending (%)	

Since the [Venue] increased its use of **bag checks**, has that affected your likelihood of attending [Venue]?

- ○ Decreased my likelihood of attending
- ○ No change in my likelihood of attending
- ○ Increased my likelihood of attending

Since the [Venue] increased its use of **bag checks**, how much has it increased your likelihood of attending [Venue]?

For example, if you would have attended 3 events but now you would attend 6 events, that is an increase of 100%.

○ Increased my likelihood of attending by up to 100%

○ Increased my likelihood of attending by more than 100%

Since [Venue] increased their use of **bag checks**, what percent has your willingness to attend [Venue] decreased by?

For example, if you would have attended 4 events but now you would only attend 2, that is a decrease of 50%.

-100 -90 -80 -70 -60 -50 -40 -30 -20 -10 0

Likelihood of attending (%)	

Since [Venue] increased their use of **bag checks**, what percent has your willingness to attend [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 6, that is an increase of 50%.

More than 100% increase

0 10 20 30 40 50 60 70 80 90 100

Likelihood of attending (%)	

Since the [Venue] increased its use of **bag checks**, what percent has your likelihood of attending [Venue] increased by?

For example, if you would have attended 4 events but now you would attend 12, that is an increase of 200%.

100 200 300 400 500

Likelihood of attending (%)	

Please indicate how much you agree (or disagree) with the following statements regarding the increased use of **video cameras** at the [Venue].

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The increased use of video cameras at the [Venue] makes me feel safer about attending.	○	○	○	○	○
The increased use of video cameras at the [Venue] makes my visits less enjoyable.	○	○	○	○	○
The increased use of video cameras at the [Venue] invades my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the increased use of **security guards** at the [Venue].

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The increased use of security guards at the [Venue] makes me feel safer about attending.	○	○	○	○	○
The increased use of security guards at the [Venue] makes my visits less enjoyable.	○	○	○	○	○
The increased use of security guards at the [Venue] invades my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the increased use of **metal detectors** at the [Venue].

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The increased use of metal detectors at the [Venue] makes me feel safer about attending.	○	○	○	○	○
The increased use of metal detectors at the [Venue] makes my visits less enjoyable.	○	○	○	○	○
The increased use of metal detectors at the [Venue] invades my privacy.	○	○	○	○	○

Please indicate how much you agree (or disagree) with the following statements regarding the increased use of **bag checks** at the [Venue].

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The increased use of bag checks at the [Venue] makes me feel safer about attending.	○	○	○	○	○
The increased use of bag checks at the [Venue] makes my visits less enjoyable.	○	○	○	○	○
The increased use of bag checks at the [Venue] invades my privacy.	○	○	○	○	○

If 20 separate people attempted to conduct an act of terrorism inside the [Venue], by use of a weapon, how many do you think would be successful given current countermeasures?

0 2 4 6 8 10 12 14 16 18 20

1	

If 20 separate people were going to commit an assault or robbery at the [Venue] (e.g. mugging, pickpocketing, purse snatching), how many do you think would be successful given current countermeasures?

0 2 4 6 8 10 12 14 16 18 20

1 

As you prepare to answer the next few questions, please keep in mind that previous surveys have found that the amounts that people SAY they are willing to pay for things are sometimes different from the amounts that they would ACTUALLY be willing to pay if these options became available. For this reason, as you answer the following questions, please imagine you are actually paying these costs.

The following 9 questions are an example of one variation of the 16 WTP question scenarios [reduction in terrorist attack risk; 5 min increase in wait time; some additional privacy invasion]:

Suppose you were considering attending an event similar to the most recent one that you attended at the [Venue] and that tickets were $20.

Would you be willing to pay an extra $1 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **90%** of the current risk (a **10%** risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

- ○ Yes
- ○ No

Would you be willing to pay an extra $1 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **half** of the current risk (a **50**% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

○ Yes

○ No

Would you be willing to pay an extra $1 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **10**% of the current risk (a **9**0% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

○ Yes

○ No

Would you be willing to pay an extra $3 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **9**0% of the current risk (a **1**0% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

○ Yes

○ No

Would you be willing to pay an extra $3 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **half** of the current risk (a **5**0% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

○ Yes

○ No

Would you be willing to pay an extra $3 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **1**0% of the current risk (a 90% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

- ○ Yes
- ○ No

Would you be willing to pay an extra $5 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **9**0% of the current risk (a **1**0% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

- ○ Yes
- ○ No

Would you be willing to pay an extra $5 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to **half** of the current risk (a **5**0% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

- ○ Yes
- ○ No

Would you be willing to pay an extra $5 for admission to each event you attend at the [Venue] to improve security through personal screening (e.g., more bag checks, metal detectors) that would reduce the risk of a successful terrorist attack to 10% of the current risk (a 90% risk reduction), and would cause a 5 minute increase in wait times and would involve some additional privacy invasion.

- ○ Yes
- ○ No

Which of the following factors has prevented you from attending events at [Venue] more often? Check all that apply.

- [ ] Cost of attendance
- [ ] Inconvenience of traveling to [Venue]
- [ ] Lack of interest in events
- [ ] Lack of time
- [ ] Too busy
- [ ] Increased use of video cameras
- [ ] Increased use of security guards
- [ ] Increased use of metal detectors
- [ ] Increased use of bag checks
- [ ] Other: _____

What year were you born?

▼ 2002 ... 1921

What is the highest level of school you have completed or the highest degree you have received?

- ○ Attended high school
- ○ High school graduate (high school diploma or equivalent GED)
- ○ Some college but no degree
- ○ Associate's degree
- ○ Bachelor's degree

- ○ Master's degree
- ○ Professional degree (J.D., M.D.)
- ○ Doctoral degree

Choose one or more:

- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native
- ☐ Asian
- ☐ Native Hawaiian or Pacific Islander
- ☐ Hispanic or Latino
- ☐ Other: Please specify

Are you:

- ○ Male
- ○ Female

Please give your best estimate of your typical annual household gross income before taxes or other deductions (including alimony, social security, or any other government assistance) in the past few years?

- ○ Less than $10,000
- ○ $10,000 - $19,999

- ○ $20,000 - $29,999
- ○ $30,000 - $39,999
- ○ $40,000 - $49,999
- ○ $50,000 - $59,999
- ○ $60,000 - $69,999
- ○ $70,000 - $79,999
- ○ $80,000 - $89,999
- ○ $90,000 - $99,999
- ○ $100,000 - $149,999
- ○ $150,000 or more

What is the ZIP code of the residence where you have lived in the last 12 months?

_____

Appendix 4A. Management Structured Interview

Start of Block: 1. General awareness and perception of countermeasures

The management team has recently upgraded security measures and initiated new ones at this venue. These measures include the installation of additional CCTV cameras, security guards, metal detectors, perimeter restrictions, or bomb detection K9 teams.

Have you received any compliments from guests about any of the security changes?

_____

Have you received any complaints from guests about security changes?

_____

Do you believe the newly installed or enhanced security measures are effective at deterring criminals and terrorists? Why?

_____

Do you believe the newly installed or enhanced security measures are effective at apprehending criminals and terrorists after a crime? Why? SEP

_____

Do you believe the newly installed or enhanced security measures have either increased or decreased attendance? Why? SEP

_____

End of Block: 1. General awareness and perception of countermeasures

Start of Block: 2. Psychological impacts of security measures

What impacts do you believe <countermeasure 1> had on your guests?

- ☐ Countermeasure _____
- ☐ feel safer?
- ☐ Visit more enjoyable?
- ☐ Invasion of privacy?
- ☐ Delays
- ☐ Inconvenience
- ☐ Other?

*

What impacts do you believe <countermeasure 2> had on your guests?

- [ ] Countermeasure _____
- [ ] feel safer?
- [ ] Visit more enjoyable?
- [ ] Invasion of privacy?
- [ ] Delays
- [ ] Inconvenience
- [ ] Other?

What impacts do you believe <countermeasure 3> had on your guests?

- [ ] Countermeasure _____
- [ ] feel safer?
- [ ] Visit more enjoyable?
- [ ] Invasion of privacy?
- [ ] Delays
- [ ] Inconvenience
- [ ] Other?

End of Block: 2. Psychological impacts of security measures

Start of Block: 3. Business Willingness to Pay for Security

Would you offer a discount to offset potential negative impacts of enhanced security on the game experience and to increase attendance?

- ○ If “Yes”, ask how much?
- ○ If “No”, ask why?
- ○ Somewhat positive

End of Block: 3. Business Willingness to Pay for Security

Start of Block: 4. Decision to install countermeasures

What countermeasures have you introduced or substantially upgraded in the past 3 years? ⁞

_____

Please provide approximate dates for when each countermeasure was installed or upgraded.

_____

Tell us why you (or someone else in your organization) chose to install or upgrade specific countermeasures. Below are some response options SEP

- ☐ Actual experience with terrorism at in the last three years
- ☐ Actual experience with terrorism at a neighboring site
- ☐ Actual experience at a similar site somewhere in the US
- ☐ Actual experience at a similar site elsewhere in the world
- ☐ A study of performed by your company
- ☐ A study of by a consultant or government agency
- ☐ A general warning issued by DHS or other government agency
- ☐ A general warning issued by a local, state or regional government agency
- ☐ Other (please explain) _____

End of Block: 4. Decision to install countermeasures

Start of Block: 5. Effects on revenues

Tell us your overall perception of the effect <countermeasure X> has had on sales revenue.

- ○ Extremely positive
- ○ Somewhat positive
- ○ Neither positive nor negative
- ○ Somewhat negative
- ○ Extremely negative

Do you think <X Venue>'s annual revenue has increased, decreased, or remained the same from security measures?"

- ○ If "Increase", ask "How much do you think your monthly revenue will increase?" _____
- ○ If "Decrease", ask "How much do you think your monthly revenue will decrease?" _____
- ○ Stayed the same

End of Block: 5. Effects on revenues

Start of Block: 6. Background questions

How did you inform your guests about the presence of <countermeasure 1>:

- ☐ Company website
- ☐ Press release/newspaper/radio/TV
- ☐ Social media announcement
- ☐ Mass mailing
- ☐ Postings at your site
- ☐ Other (please explain)
- ☐ Did not inform customers

How did you inform your guests about the presence of <countermeasure 2>:

- [ ] Company website
- [ ] Press release/newspaper/radio/TV
- [ ] Social media announcement
- [ ] Mass mailing
- [ ] Postings at your site
- [ ] Other (please explain)
- [ ] Did not inform customers

How did you inform your guests about the presence of <countermeasure 3>:

- [ ] Company website
- [ ] Press release/newspaper/radio/TV
- [ ] Social media announcement
- [ ] Mass mailing
- [ ] Postings at your site
- [ ] Other (please explain)
- [ ] Did not inform customers

What is your Job Title? LSEP

_____

In which department do you work? How long have you been in your current *position?* ⟦SEP⟧

_____

End of Block: 6. Background questions

Appendix 6A. IMPLAN I-O Model Sectoral Aggregation Scheme

Table 6A-1. IMPLAN I-O Model Sectoral Aggregation Scheme

Sector #	Description	NAICS	IMPLAN Sector
1	Crop Farming	111	1-10
2	Livestock	112	11-14
3	Forestry & Logging	113	15-16
4	Fishing, Hunting & Trapping	114	17-18
5	Ag & Forestry Svcs	115	19
6	Oil & Gas Extraction	211	20-21
7	Mining	212	22-36
8	Mining Services	213	37-40
9	Utilities	221	41-51, 519, 522, 525
10	Construction	230	52-64
11	Food products	311	65-105
12	Beverage & Tobacco	312	106-111
13	Textile Mills	313	112-118
14	Textile Products	314	119-123
15	Apparel	315	124-130
16	Leather & Allied	316	131-133
17	Wood Products	321	134-145
18	Paper Manufacturing	322	146-153
19	Printing & Related	323	154-155
20	Petroleum & Coal Products	324	156-160
21	Chemical Manufacturing	325	161-187
22	Plastics & Rubber Products	326	188-198
23	Nonmetal Mineral Products	327	199-216
24	Primary Metal Mfg	331	217-230
25	Fabricated Metal Products	332	231-261
26	Machinery Mfg	333	262-300
27	Computer & Electronic Products	334	301-324
28	Electrical Eqpt & Appliances	335	325-342
29	Transportation Eqpmt	336	343-367
30	Furniture & Related Products	337	368-378
31	Miscellaneous Mfg	339	379-394
32	Wholesale Trade	42	395
33	Motor Veh & Parts Dealers	441	396
34	Furniture & Home Furnishings	442	397
35	Electronics & Appliances Stores	443	398

Sector #	Description	NAICS	IMPLAN Sector
36	Bldg Materials & Garden Dealers	444	399
37	Food & Beverage Stores	445	400
38	Health & Personal Care Stores	446	401
39	Gasoline Stations	447	402
40	Clothing & Accessories Stores	448	403
41	Sporting Goods, Hobby, Book, & Music Stores	451	404
42	General Merchandise Stores	452	405
43	Miscellaneous Store Retailers	453	406
44	Non-Store Retailers	454	407
45	Air Transportation	481	408
46	Rail Transportation	482	409
47	Water Transportation	483	410
48	Truck Transportation	484	411
49	Transit & Ground Passengers	485	412, 521, 524
50	Pipeline Transportation	486	413
51	Sightseeing Transportation	487	414
52	Postal service, Couriers & Messengers	492	415, 518
53	Warehousing & Storage	493	416
54	Publishing Industries	511	417-422
55	Motion Picture & Sound Recording	512	423-424
56	Broadcasting	515	425-426
57	Telecommunications	517	427-429
58	Internet & Data Process Svcs	518	430
59	Other Information Services	519	431-432
60	Monetary Authorities	521	433
61	Credit Intermediation & Related	522	434
62	Securities & Other Financial	523	435-436
63	Insurance Carriers & Related	524	437-438
64	Funds, Trusts, & Other Financial Vehicles	525	439
65	Real Estate	531	440
66	Rental & Leasing Svcs	532	442-445
67	Lessor of Nonfinance Intangible Assets	533	446
68	Professional, Scientific & Tech Svcs	541	447-460
69	Management of Companies	551	461
70	Admin Support Svcs	561	462-470
71	Waste Mgmt & Remediation Svcs	562	471
72	Educational Svcs	611	472-474
73	Ambulatory Health Care	621	475-481
74	Hospitals	622	482

Sector #	Description	NAICS	IMPLAN Sector
75	Nursing & Residential Care	623	483-484
76	Social Assistance	624	485-487
77	Performing Arts & Spectator Sports	711	488-492
78	Museums & Similar	712	493
79	Amusement, Gambling & Recreation	713	494-498
80	Accommodations	721	499-500
81	Food Svcs & Drinking Places	722	501-503
82	Repair & Maintenance	811	504-508
83	Personal & laundry Svcs	812	509-512
84	Religious, Grantmaking, & Similar Orgs	813	513-516
85	Private Households	814	517
86	Government & Non NAICS	92	520-536, except for 521,522,524,525

Appendix 6B. Spending Vectors of MLB Stadium, NBA/NHL Arena, and Convention Center Attendees

Table 6B-1. Summary of Spending Vectors of Visitors to Baseball Events (daily per-person spending; in 2018$)

Spending Category	Atlanta SunTrust (Baseball) Park	
	$ Amount	Percent
Accommodations	17.20	16.0%
Restaurants	26.90	25.0%
Retail	17.20	16.0%
Entertainment/Recreation	10.80	10.0%
Transportation	32.30	30.0%
Other	3.20	3.0%
Total	107.60	100.0%

Source: CEDR (2018).

Table 6B-2. Spending Vectors of Visitors to NBA/NHL Events at Seattle Arena (per visitor day spending; converted to 2018$)

Spending Category	Outside of County	
	$ Amount	Percent
Lodging	6.95	14.5%
Food & Beverage	12.16	25.4%
Retail/ Merchandise/ Souvenir	10.74	22.4%
Entertainment	4.18	8.7%
Bus/ Public Transit	0.37	0.8%
Parking	7.10	14.8%
Auto Travel	6.40	13.4%
Total	47.90	100.0%

Source: Pro Forma Advisors LLC (2013).

Table 6B-3. Wisconsin Center Conventions Attendee Spending
(per visitor day spending; converted to 2018$)

Spending Category	Overnight Convention Attendees		Daytrip Convention Attendees	
	$ Amount	Percent	$ Amount	Percent
Hotel Average Daily Room Rate	123.60	39.0%	n.a.	n.a.
Other Hotel Charges	41.20	13.0%	n.a.	n.a.
Food & Beverage	69.73	22.0%	67.95	45.0%
Retail	31.70	10.0%	30.20	20.0%
Recreation	25.35	8.0%	25.66	17.0%
Transportation at Destination	28.52	9.0%	27.18	18.0%
Total	320.10	100.0%	150.99	100.0%

Source: HVS (2019).

Table 6B-4. Broward County, Florida Convention Center Attendee Spending
(per visitor day spending; converted to 2018$)

Spending Category	Overnight Convention Attendees		Daytrip Convention Attendees	
	$ Amount	Percent	$ Amount	Percent
Hotel Average Daily Room Rate	$171.23	50.0%	n.a.	n.a.
Other Hotel Charges	$51.37	15.0%	n.a.	n.a.
Food services & drinking places	$58.22	17.0%	$59.13	56.0%
Retail	$27.40	8.0%	$27.45	26.0%
Museums, historical sites, zoos, and parks	$10.27	3.0%	$9.51	9.0%
Motion picture and video industries	0	0.0%	$1.06	1.0%
Scenic and sightseeing transportation	$3.43	1.0%	$4.23	4.0%
Transit and ground passenger transportation	$6.84	2.0%	$2.11	2.0%
Automobile equipment rental and leasing	$6.84	2.0%	0	0.0%
Gasoline Stations	$3.43	1.0%	$2.11	2.0%
Total	$339.04	100.0%	$105.60	100.0%

Source: HVS (2014).

Table 6B-5. Philadelphia Convention Center Attendee Spending (per visitor event spending; in 2018$)

Spending Category	$ Amount		Percent
	Per Event	Per Day	
Lodging	225.83	104.07	42.1%
Food & Beverage	139.47	64.27	26.0%
Business Services	49.89	22.99	9.3%
Retail	39.16	18.05	7.3%
Recreation	33.79	15.57	6.3%
Transportation	38.09	17.55	7.1%
Other	10.19	4.70	1.9%
Total	536.42	247.20	100.0%

Source: PCVB (2019).

Table 6B-6. New Orleans Convention Center Attendee Spending (per visitor trip spending; in 2018$)

Spending Category	$ Amount		Percent
	Per Event	Per Day	
Lodging	442.55	203.94	43.4%
Restaurants/Meals	259.18	119.44	25.4%
Shopping	104.49	48.15	10.3%
Bars/Nightclubs	62.49	28.80	6.1%
Recreation/Entertainment	71.71	33.05	7.0%
Gambling	21.51	9.91	2.1%
Local Transportation	57.37	26.44	5.6%
Total	1,019.30	469.72	100.0%

Source: Ortiz (2018).

Table 6B-7. Average Spending of Convention Center Attendees (in 2018$)

Spending Category	Wisconsin CC	Broward County, FL CC	Philadelphia CC	New Orleans CC	Average Spending
Accommodations	$164.80	$222.60	$127.06	$203.94	$179.60
Retail	$31.70	$37.67	$18.05	$48.15	$33.89
Local Transportation	$28.52	$10.27	$22.25	$26.44	$21.87
Food & Beverage	$69.73	$58.22	$64.27	$119.44	$77.91
Recreation/Entertainment	$25.35	$10.27	$15.57	$71.76	$30.74
Total	**$320.10**	**$339.04**	**$247.20**	**$469.72**	**$344.01**

Source: Compiled by the authors from Tables 6B-3 to 6B-6.