



# Measuring Police Officer Self-efficacy for Working with Individuals with Autism Spectrum Disorder

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## Abstract

Autism spectrum disorder (ASD) is currently one of the most researched of all childhood developmental disorders and is receiving attention in many domains. The purpose of this study was to design and provide psychometric evidence for a scale that measures police officer self-efficacy for working with individuals with ASD. Psychometric properties of a scale designed to measure knowledge of ASD were also explored. Data from 620 police officers were collected and a 13-item scale was created and evaluated. Results indicated that the scale represented a unidimensional construct. Knowing more about officers' knowledge and beliefs in their own capabilities to work with individuals with ASD can help inform future police education and training efforts.

**Keywords** Police officer · Self-efficacy · Autism spectrum disorder · Scale development · Psychometrics · Autism knowledge

## Introduction

Autism spectrum disorder (ASD) is a complex neurodevelopmental disorder that is characterized by “a range of impairments in social communication and interaction as well as in restricted and repetitive behaviors and interests” (Rice et al. 2016, p. 232). ASD often occurs with other conditions (e.g., intellectual disability) and with common symptoms such as a difficulty to communicate or a tendency to be challenged by social exchanges. Because ASD presents in a diversity of ways, individuals may experience social interactions in a similar way as their neurotypical peers, or they may find social interactions extremely challenging

(American Psychiatric Association 2013). According to a study conducted by the Centers for Disease Control and Prevention, 1 in 59 children has a diagnosis of ASD, an increase from previous estimates (Baio et al. 2018). Many communities are supporting individuals with ASD in various ways such as providing “autism-friendly” services (Nagib and Williams 2017; Preece 2003) or ensuring that health-care workers are educated about ASD (Bakare et al. 2008). An “autism-friendly” service is one that has met a series of standards specifically designed to enable autistic community members to have full access to community services (e.g., libraries, emergency services, banks) and to educate and advocate for accommodations that increase accessibility.

One important consideration for many communities trying to improve their autism awareness has been the role of first responders in providing support for individuals with ASD in their communities, no matter the role that the individual takes in their interactions with law enforcement officers (e.g., suspect, victim). According to the U.S. Bureau of Justice Statistics (2017), the rate of violent victimization against persons with disabilities was 2.5 times higher than for individuals without disabilities (Harrell 2017). Individuals with disabilities, in general, are seven times more likely to interact with law enforcement officials than are their neurotypical peers (Debbaudt and Rothman 2001; Henshaw and

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Thomas 2012; Organization for Autism Research 2014), and a recent study found that one in five youth with ASD was stopped and questioned by the police before the age of 21 (Rava et al. 2017). Furthermore, results from several studies have revealed that police officers are often unknowledgeable about ASD and report concerns about how to handle situations involving persons with ASD appropriately. This may in part account for the higher prevalence of problematic interactions between officers and persons with ASD (Chown 2009; Crane et al. 2016).

Core impairments generally consistent across individuals with ASD, including deficits in communication and social interactions, which influence daily functioning and community interactions. These impairments can be the cause of miscommunication between police officers and persons with ASD. If a police officer misinterprets behaviors of an individual with ASD or fails to find a way to communicate with a person in crisis, negative outcomes can follow (Copenhaver and Tewksbury 2018). Section II of the Americans with Disabilities Act specifies that communities must “take appropriate steps to ensure that communications with applicants, participants, members of the public, and companions with disabilities are as effective as communications with others” (U.S. Department of Justice 2010, p. 50). Because ASD results in deficits in social communication, police officers need to consider how they will communicate with someone who may not communicate in a traditional manner. Researching interventions that target educating police officers about ASD can help guarantee that interactions within communities are efficient and constructive (Pellicano et al. 2014). Knowledgeable officers may also serve as community resources for families and others navigating the challenges of ASD.

Police officers are trained to handle diverse circumstances and individuals to better serve their communities. Training of police officer recruits has shifted in recent years from a focus on technical and mechanical aspects of policing to a focus on problem solving, diversity training, and community engagement (Albrecht 2019; Chappell 2007). To be an efficacious officer, one must be willing to serve and protect all individuals and must be able to interact with and support a variety of people within an unpredictable daily environment. This goal, to serve and protect all community members, is evident in many police departments’ mission statements (e.g., Louisville Metro Police Department 2019). Many departments are responding to state mandates (e.g., Kentucky and New Jersey) that ask for specific training for officers on how to carry out their duties when interacting with someone with ASD (e.g., conducting traffic stops, patrolling designated areas, answering calls for help) (Kelly and Hasset-Walker 2016). As police departments are making more attempts to provide appropriate training to officers, assessment tools must exist to determine training effectiveness.

For example, measuring police officers’ competencies and confidence for working with persons with ASD can help departments evaluate the trainings, identify gaps in officer’s knowledge of ASD, and understand how to better educate their officers. This study proposes one such instrument that will assess police officer self-efficacy for interacting with individuals with ASD while serving in their professional role.

## Theoretical Framework and Literature Review

Our study draws on the historical perspective of Bandura’s (1986) social cognitive theory, which posits that human functioning can be explained by the reciprocal interactions of personal, environmental, and behavioral factors. From this perspective, the effective response of police officers (i.e., behaviors) depends both on environmental circumstances (e.g., encountering persons with ASD who may be in distress) and intrapersonal factors, such as the skills, knowledge, and beliefs officers have relative to their professional responsibilities. Officers are guided by a belief in their own capabilities to carry out certain actions, or their *self-efficacy* (Bandura 1997).

In diverse areas of human functioning, self-efficacy has been shown to influence how much effort people put forth, whether they persist in the face of obstacles, and the amount of stress they experience (Bandura 1997). Therefore, self-efficacy is a powerful determinant of human motivation and behavior. Unless people believe they can successfully perform tasks before them, they will have little incentive to act. Understanding police officers’ self-efficacy may help to predict their behavior and motivation to persevere in a challenging situation, such as supporting an individual with ASD during an emergency situation.

### Self-efficacy Among Professionals

Although self-efficacy for working with individuals with ASD has not been measured in the context of policing, self-efficacy has been explored in a number of service and care professions. For example, in nursing, high levels of self-efficacy have been shown to play a protective role against workplace incivility and burnout (Fida et al. 2018). Nurses who reported higher self-efficacy also reported lower levels of burnout than their peers. In education, teachers’ self-efficacy, or judgments about their capabilities to help their students learn, has been shown to influence a range of outcomes including teachers’ stress, psychological well-being, and instructional approach (Love et al. 2019a, b; Zee and Koomen 2016). Ruble et al. (2013) found that teachers who reported higher levels of self-efficacy for working

with students with ASD also reported lower levels of stress. Research has also documented the various adverse effects of professionals who report low self-efficacy beliefs. For example, Eun and Heining-Boynton (2007) found that teachers who reported lower levels of self-efficacy were less likely to use knowledge and skills gained during professional development opportunities than teachers with higher levels of self-efficacy. It is unclear whether associations found in professions such as nursing and teaching might generalize to police officer occupational tasks; however, developing a psychometrically sound scale that measures self-efficacy in the policing context is an important first step.

### Police Officer Self-efficacy for Working with Individuals with ASD

The associations between police officer self-efficacy for working with individuals with ASD and other outcomes (e.g., stress,) have not yet been established. Although ASD-specific self-efficacy scales do not exist, police officer self-efficacy has been studied with regard to working with individuals with psychiatric syndromes such as depression or schizophrenia (Bahora et al. 2008). Preliminary evidence has pointed to possible outcomes related to police self-efficacy. For example, Bahora et al. (2008) created an instrument to assess officers' self-efficacy after crisis intervention training. Police officers responded to vignettes about individuals with psychiatric syndromes by answering 10 items and responding using a 4-point Likert-type response format ranging from 1 (*Not at All Confident*) to 4 (*Very Confident*). The items, which refer to the vignette, ask officers questions such as, "How confident would you feel interacting with someone like [John]?" Results from the study indicated that officer self-efficacy for working with individuals with psychiatric illnesses (e.g., schizophrenia) and with substance abuse disorders (e.g., cocaine dependency) increased after receiving training.

Researchers using the same scale found that police officer self-efficacy for working with individuals with mental illnesses was significantly and positively associated with better de-escalation skills and referral decisions (Broussard et al. 2011). Although these studies provide an initial examination of police officer capability beliefs, neither described how the self-efficacy scale was developed nor how evidence of validity was gathered; therefore, the results should be interpreted with caution. Validity studies investigating the instrument's psychometric characteristics should be conducted to ensure that relevant evidence and rationales exist and are appropriate for the samples the instrument is being used on (AERA et al. 2014). Furthermore, these limitations in initial police self-efficacy research point to the need for an instrument that assesses police self-efficacy for working with individuals with ASD.

### Knowledge and Self-efficacy

According to social cognitive theory, increasing one's knowledge about a subject also influences one's capacity for personal agency over one's life. Therefore, in addition to examining police self-efficacy, this study also focuses on officers' knowledge of ASD. Inaccurate or a limited knowledge of ASD among health care providers has a direct impact on individuals' access to diagnosis and treatment services and on ethnic and racial disparities in service delivery (Harrison et al. 2017; Magaña et al. 2013). A deficit in the knowledge of ASD for community professionals, including police officers, has been identified as a significant research need (Gardner et al. 2018; Harrison et al. 2017, 2016). Substantial knowledge of ASD can help to decrease misinterpretations that can occur when officers interact with individuals with ASD. Those with limited knowledge may misinterpret the behaviors (e.g., repetitive movements, limited eye-contact, increased anxiety) of an individual with ASD as threatening, related to drugs or alcohol, or as mental illness.

Knowledge and self-efficacy are often studied as joint predictors of behavior (Corona et al. 2017). In the current study, self-efficacy and knowledge are jointly explored because, according to social cognitive theory, "it is not enough for individuals to possess the requisite knowledge and skills to perform a task; they also must have the conviction that they can successfully perform the required behavior(s) under typical and, importantly, under challenging circumstances" (Artino 2012, p. 77). Knowledge alone, therefore, is often insufficient. People must believe that they have the skills needed to turn their knowledge into practice under a variety of circumstances (Bandura 1997). More knowledge allows a person to predict events and exercise more control over them (Bandura 1997). We therefore expect that police officer self-efficacy in this context will be positively associated with officer knowledge of ASD.

Researchers have previously examined how self-efficacy and knowledge, both individually and together, predict professional behavior. For example, Lauermaann and König (2016) assessed teachers' general pedagogical knowledge and self-efficacy for teaching. Knowledge and self-efficacy were positively associated, and teachers with more pedagogical knowledge and higher teacher self-efficacy also reported fewer indications of burnout. Similar findings have emerged in the context of medicine. For example, Rimal (2000) found that the relationship between diet knowledge and behavior was mediated by diet self-efficacy. Specifically, "individuals' ability to act in knowledge-consistent ways is largely a function of their perceived abilities" (Rimal 2000, p. 230). Although researchers have not assessed ASD-specific knowledge and self-efficacy among police officers, it is likely that officers who know more about ASD and who report higher

perceived capabilities to work with individuals with ASD would exhibit more favorable behaviors toward individuals with ASD.

## Purpose of the Study

The purpose of this study was to develop an instrument to assess police officer self-efficacy for working with individuals with ASD and provide initial validity evidence for the interpretation of the instrument's scores. We sought to provide initial empirical evidence to support the internal structure of the new instrument (and thus its scoring) that was driven by Bandura's (1986) social cognitive theory and empirical evidence based on test content. This study will also provide additional psychometric evidence for an ASD knowledge instrument when used with a sample of police officers. Finally, this study will provide correlational evidence (convergent validity) by examining the relationship between officer self-efficacy and knowledge of ASD, which are posited to be positively correlated, as suggested by theory and evidence from other professional domains. Three primary research questions guided this study:

- 1 What is the internal structure of items designed to assess police officer self-efficacy for working with individuals with ASD?
- 2 Do items designed to assess police officer knowledge of ASD reflect a unidimensional structure?
- 3 Does a moderate positive correlation exist between police officer self-efficacy for working with individuals with ASD and knowledge of ASD?

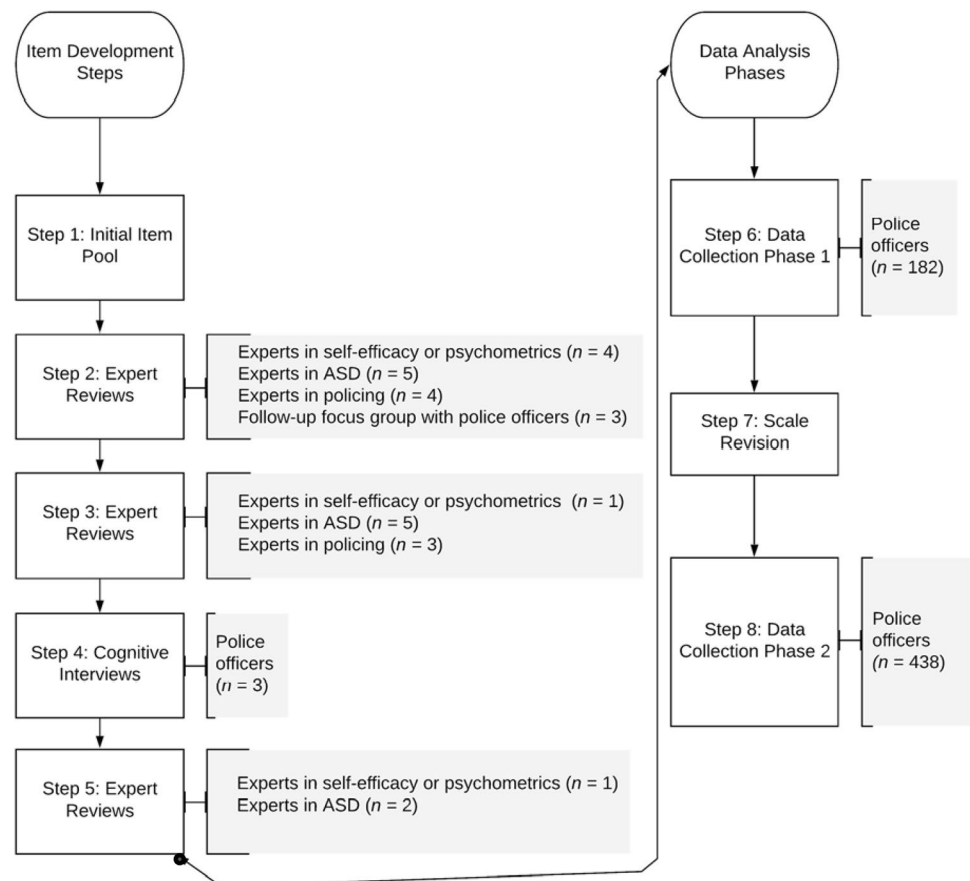
## Method

### Data Collection and Participants

Data collection occurred in two phases to provide an opportunity for iterative refinement of self-efficacy items. The instrument development process involved (a) item writing and expert review to gather evidence based on test content and response processes from experts in ASD, policing, and scale development and (b) two phases of data collection to gather empirical evidence based on internal structure and relations to other variables (see Fig. 1). Participant recruitment was conducted separately for each phase.

Active police officers (i.e., those currently working as officers) throughout the United States were considered

**Fig. 1** Steps taken to develop the Police Self-Efficacy for Autism (PSEA) scale. This process includes two phases of data collection. Steps were taken to confirm that this study reflected multiple sources of validity and reliability evidence



eligible to participate. Prior to data collection, approval was obtained from the university's Institutional Review Board (#43388). Participants were recruited by contacting the Chief of Police at departments across the country. Once the Chief's permission was obtained, a list of all active police officers within that department was secured. An e-mail with a link to an anonymous electronic Qualtrics survey was sent to all officers. During Phase 1 of data collection, reminder emails were sent to each department on a weekly

basis for two months. During Phase 2 of data collection, the survey remained open for 4 months, as an extension was required for one department that needed to seek approval from its legal department. In both phases, 7879 officers were emailed. From these emails, 683 responses were recorded. Of these, 620 were usable. Responses were only deleted if officers did not complete the PSEA items.

In total, 620 police officers took part in this study (see Table 1). In Phase 1, police officers were 76% male, with a

**Table 1** Description of study participants for Phase 1 and Phase 2

Police officer characteristics	Phase 1	Phase 2
	( <i>N</i> =182)	( <i>N</i> =438)
	Frequency (%)	Frequency (%)
Gender		
Male	138 (75.8)	318 (72.6)
Female	22 (13.7)	83 (18.9)
Other	1 (0.5)	2 (0.5)
Missing	21 (10.0)	35 (8.0)
Education		
High school diploma	21 (11.5)	58 (13.2)
GED (High School Equivalency Certificate)	1 (0.5)	4 (0.9)
Associate's degree	28 (15.4)	65 (14.8)
Bachelor's degree	18 (9.9)	70 (16.0)
Master's degree	85 (46.7)	181 (41.3)
Doctoral degree (PhD)	1 (0.5)	3 (0.7)
Other	5 (2.7)	19 (4.3)
Missing	23 (12.8)	38 (8.7)
Ethnicity/Race		
White	143 (78.6)	326 (74.4)
Latino or Hispanic	2 (1.1)	30 (6.8)
American Indian or Alaska Native	0 (0.0)	0 (0.0)
Asian or Asian American	2 (1.1)	8 (1.8)
Native Hawaiian or Pacific Islander	0 (0.0)	0 (0.0)
Black or African American	11 (6.0)	26 (5.9)
Two or more races	3 (1.6)	7 (1.6)
Other	1 (0.5)	6 (1.4)
Missing	20(11.0)	35 (6.8)
Personal connection to autism		
"I know one person with autism"	45 (24.7)	103 (23.5)
"I know two people with autism"	24 (13.2)	69 (15.8)
"I know three or more people with autism"	41 (22.5)	138 (31.5)
"No, I am not aware of anyone in my own personal life"	52 (28.6)	93 (21.2)
Missing	20 (11.0)	35 (8.0)
Professional experience with autism		
"Never"	7 (3.8)	23 (5.3)
"Once a year"	52 (28.6)	150 (34.2)
"Once a month"	48 (26.4)	90 (20.5)
"Once a week"	6 (3.3)	32 (7.3)
"Once a day"	7 (3.8)	13 (3.0)
"I'm not sure"	42 (23.1)	95 (21.7)
Missing	20 (11.0)	35 (8.0)



mean age of 39 years ( $SD=10.27$ ). Police officers reported an average of 14 years of law enforcement experience ( $SD=8.74$ ). In Phase 2, police officers were 73% male, with a mean age of 42 years ( $SD=8.82$ ). Police officers reported an average of 17 years of experience ( $SD=8.98$ ). Because demographic items were optional, demographic data are missing for some participants. To maintain anonymity, we did not ask officers to disclose the department they worked for. However, to estimate the representation of participants across the United States, the Internet Protocol addresses that officers used to answer the survey, which provides a geographic stamp, were analyzed and indicated that officers came from urban and rural locations across 19 states. Georgia, Kentucky, Texas, and Ohio made up 76% of the data.

## Instruments

### Police Officer Self-efficacy for Working with Individuals with ASD

The Police Self-Efficacy for Autism (PSEA) instrument was developed for this study. Items assessing police officer self-efficacy for working with individuals with ASD were selected through an iterative process including examination of relevant literature, consultation with experts ( $n=28$ ), cognitive interviews with police officers ( $n=3$ ), and iterative item writing (Kline 2016) to ensure the items are reflective of multiple perspectives, relevant theory, and concise wording. The initial pool of items was developed from informal discussions with police officers, families of individuals with ASD, individuals with ASD, and from consultation with various professionals such as special education teachers, psychologists, and advocates working with individuals with ASD.

Instrument development procedures require a thorough process whereby evidence for validity is gathered from multiple sources to evaluate the appropriateness of an instrument for a particular use (AERA et al. 2014). To create items based on a clear process and strong evidence, the potential items were reviewed in four primary steps of item development (see Fig. 1). The item development process was mapped from the initial pool to the final instrument by recording details of when and why items were added, removed, or changed. Items were revised throughout this process to ensure they were clear, concise, and distinct. Attention was given to the extent that items maximized individual differences.

### Expert Review

The first step of item review was consultation with experts. Rubio et al. (2003) recommended identifying experts as those who share similar demographics as future participants

or as individuals who are specialists in the field, with at least three participants per group. Three classes of experts were identified (see Fig. 1). Police officers ( $n=9$ ) qualified as experts if they were currently veteran officers who had an experience with a person with ASD while working as a police officer based on self-report. A second group of experts comprised family members of individuals with ASD ( $n=12$ ). Finally, self-efficacy experts ( $n=7$ ) included professors who specialized in the measurement or evaluation of self-efficacy as a construct and those who focused on psychometrics and instrument development.

For each item, experts were asked to evaluate clarity of wording, level of importance, and the degree to which the item was realistic when considering the duties of the police officers. Each expert completed a review of the initial pool of items independently in an iterative process throughout item development until consensus was achieved (see Fig. 1). Consensus was determined when no experts requested further deletion or modification of the items. In total, there were three rounds of expert reviews.

After the initial round of expert reviews, a follow-up focus group was conducted with a new sample of three police officers to gather more detailed information on item wording and appropriateness for police officers. The officers expanded on their review of each item to provide suggested revisions when the item was not clear. This stage was crucial in preparing a set of items that reflected the needs of police officers and included appropriate terminology.

### Cognitive Interviews

A second step taken in the instrument development process involved cognitive interviews with police officers to confirm that they were interpreting items as intended. The goal of this step was to provide a degree of evidence for validity based on response processes (AERA et al. 2014). This step helps “identify items where there is a misalignment between participant interpretation and the developer’s intentions and to identify ways to modify those items” (Peterson et al. 2017, p. 217). The goal of these interviews was to use think-aloud questioning to gather an understanding about how the participants were interpreting the items, ensuring this aligned with the content and goals of the PSEA (Peterson et al. 2017). Cognitive interviews were completed after the second round of expert reviews.

Three new participants were recruited to take part in the cognitive interviewing phase (see Fig. 1). Respondents were recommended by the Police Chief from one department based on having a range of experiences working with individuals with ASD as well as range of experience on the police force. The purpose of seeking participation from officers with a range of experience was to confirm that participants had varying perspectives and levels of knowledge

of ASD. The first author conducted cognitive interviews over the phone with each officer and followed verbal scripts and scripted probes. All interviews were reviewed by the first author, and opportunities for item modification were flagged. This interviewing methodology is consistent with recommendations by Willis (2013) and Peterson et al. (2017).

Following the cognitive interviews, the items were subjected to one more expert review process. Fifteen items were retained after expert reviews and cognitive interviewing. These items were passed on to the quantitative data collection stage (i.e., computerized survey).

### Knowledge of ASD

The Autism Stigma & Knowledge Questionnaire (ASK-Q) was used to gather a self-assessment of participants' knowledge about ASD (Harrison et al. 2017). The 48-item instrument consists of four subscales: (a) diagnosis (18 items), (b) etiology (18 items), (c) treatment (15 items), and (d) stigma (11 items), although the original authors of the questionnaire reported both subscale scores and a total score. Participants were asked to "agree" or "disagree" with given statements (e.g., "Vaccinations cause autism."). Items were then marked as correct or incorrect according to a scoring guide provided by Harrison et al. (2017). The first item, "I have knowledge of autism," was used as a screener question and was not included in analyses. Harrison et al. used diagnostic classification modeling to gather evidence for the initial psychometric properties of the questionnaire including factor structure and item validity. A total score reliability of  $\alpha = 0.88$  was reported by Harrison et al. for the 48 items in their instrument, which were administered to a sample of 617 participants, comprising university students ( $n = 313$ ) and members of the general public ( $n = 304$ ).

## Analyses and Results

### Phase 1

The primary goal of Phase 1 was to explore the psychometric properties of 15 items on the newly developed self-efficacy instrument and to test the hypothesis that a unidimensional solution exists. Fifteen items emerged from the expert review and cognitive interviewing process and were then shared with 182 officers through an online survey. Results of the item-level descriptive data including (i.e., means, standard deviations, skewness) can be provided by the first author on request. The items were further evaluated by examining a polychoric correlation matrix to ensure that all items were intercorrelated above 0.30. Based on this matrix, only Item 13 ("I can look for an ID when I cannot get personal information verbally from an individual with

autism") was flagged for possible removal or modification because it demonstrated consistently low correlations with other items ( $< 0.30$ ).

Frequency distributions of each item were examined to understand how officers used each of the response format categories. Categories 3 (*Somewhat Agree*) and 4 (*Strongly Agree*) were used most frequently, and Categories 1 (*Strongly Disagree*) and 2 (*Somewhat Disagree*) were used less frequently. Item 13 ("I can look for an ID when I cannot get personal information verbally from an individual with ASD") and Item 14 ("I can inform a concerned citizen about autism") were the most discriminating items. Item 1 ("I can identify some signs of autism when I observe them") and Item 12 ("I can seek appropriate information from a caregiver when trying to learn more about someone with autism") were the least discriminating items.

Next, exploratory factor analysis (EFA) was conducted to examine the internal structure of the items designed to assess police officer self-efficacy. The Kaiser–Meyer–Olkin measure of sampling was 0.88, which is above the recommended value of 0.50 (Williams et al. 2012). Bartlett's test of sphericity was statistically significant (941.34,  $p < 0.001$ ). Results from the scree procedure (Cattell 1966) and Horn's (1965) parallel analysis (Lim and Jahng 2019) revealed that a unidimensional solution represented the 15 PSEA items for this sample. Factor pattern loadings are presented in Table 2. All items loaded heavily ( $\lambda \geq 0.50$ ) on Factor 1, except for Item 13 ( $\lambda = 0.28$ ). Internal consistency was based on coefficient omega using Maximum Likelihood (ML),  $\omega = 0.88$  bootstrap corrected [BC] 95% CI [0.83, 0.91].

Item 13 ("I can look for an ID when I cannot get personal information verbally from an individual with autism") was flagged during the item-level descriptive stage and again during the EFA. Because the item represents an important behavior for police officers to carry out with individuals with ASD (i.e., obtaining identifying information when a person is not communicating verbally) and because empirical evidence showed that the item was one of the most discriminating, it was not deleted. Instead, the item wording was modified to "I can gather identifying information from someone with autism who does not use verbal speech." This modification was written in consultation with two individuals: a police officer and a family member of an individual with ASD.

Item 6 ("I can recognize which of the behaviors below are frequently associated with autism") and Item 7 ("I can correctly identify which of the following are common in people with autism") were also reviewed, as the format of these two items varied from that of the other items. For these two items, officers were asked to judge their capability to respond to a set of behaviors often associated with autism. Although empirical data did not suggest that these items were problematic, a team of psychometric

**Table 2** Exploratory factor analysis results and Phase 1 items (N = 182)

Item	$\lambda$	$h^2$
1. I can identify some signs of autism when I observe them	0.82	0.67
2. I can de-escalate a situation in which a person with autism is harming others	0.68	0.46
3. I can de-escalate a situation in which a person with autism is harming himself or herself	0.73	0.53
4. I can explain at least three general characteristics of a person with autism to another police officer who asks	0.73	0.53
5. I can distinguish autism from other disabilities	0.75	0.56
6. I can recognize which of the behaviors below are frequently associated with autism: Hearing voices Avoidance of eye contact Lack of balance Repetitive body motions Slurred speech	0.73	0.53
7. I can correctly identify which of the following are common in people with autism: Communication challenges Mental illness Social anxiety Physical impairment Intellectual disability	0.72	0.52
8. I can tell the difference between someone who has autism and someone who is demonstrating drug-induced behavior	0.59	0.35
9. I can adapt the way I communicate to explain something to a person with autism	0.72	0.52
10. I can establish rapport with someone who has autism	0.50	0.25
11. I can use what I know about autism to help find an individual with autism who has become a missing person	0.72	0.52
12. I can seek appropriate information from a caregiver when trying to learn more about someone with autism	0.55	0.30
13. I can look for an ID when I cannot get personal information verbally from an individual with autism	0.28	0.08
14. I can inform a concerned citizen about autism	0.86	0.74
15. I can modify the environment to help an individual with autism feel calm during an emergency	0.62	0.39

$h^2$  = communalities;  $\lambda$  = factor loading. 47.95% of common variance was explained by the factor solution. Respondents replied using a 4-point Likert-type response format that ranged from 1 (*Not at All Confident*) to 4 (*Very Confident*). The stem for each item was “When working as a police officer.”

experts was consulted to review the wording and unique format. The psychometric consultants determined that these items were too different in format from the other items and therefore could present unnecessary challenges to respondents. We therefore removed the items, which resulted in a 13-item PSEA scale for use in Phase 2.

### Psychometric Properties of the ASK-Q

A secondary goal of this study was to evaluate the psychometric properties (e.g., dimensionality, item difficulty) of items designed to assess knowledge of ASD (i.e., the ASK-Q) among a sample of police officers. Rasch methods were used to evaluate the reliability. Person separation reliability for the questionnaire was satisfactory at 0.83. Item separation reliability was also found to be acceptable at 0.97. Finally, the overall internal consistency was very good ( $\alpha = 0.91$ ).

### Dimensionality Assessment

Outcomes of the Rasch Principal Components Analysis (R-PCA) were used to confirm unidimensionality. Results indicated that 45.8% of the variance was explained by the ASK-Q model. The contrasts (correlated residual clusters) were further investigated to ensure that a unidimensional structure with uncorrelated random residuals was present (Linacre 2019). Results indicated that the existing contrasts represented less than 4% of the unexplained variance. These results provided confirming evidence for the unidimensional structure of the data. Calculating a total score for items is therefore appropriate for representing officers’ knowledge of ASD, which we henceforth refer to as “ASD Knowledge.”

### Instrument Refinement

After unidimensionality was established, the ASK-Q was further examined to confirm that all items contributed to the



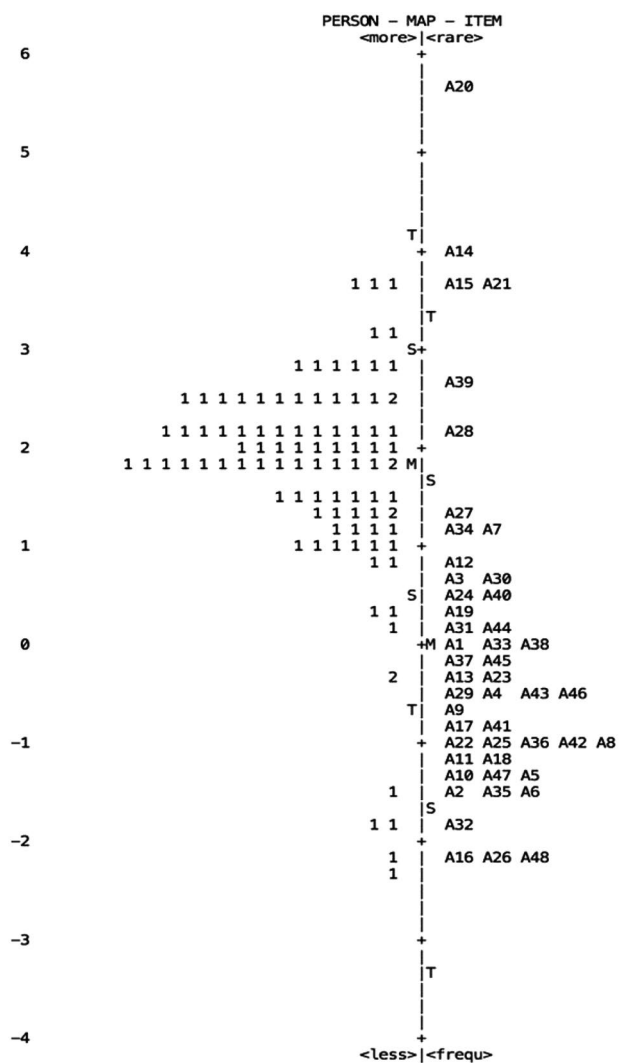
construct (i.e., knowledge of ASD). Infit values were examined according to recommendations by Bond and Fox (2015) to determine whether items needed to be flagged for removal prior to Phase 2 analyses. Five items were flagged for further review and both Mean square fit statistics (MnSq) and standardized fit statistics (ZSTD) are provided in Table 4. Item 3 (“Children with autism may have strange reactions to the way things smell, taste, look, feel, or sound”; MnSq=0.6), Item 26 (“Some children with autism show intense interest in parts of objects”; MnSq=0.7), Item 29 (“Autism is a communication disorder”; MnSq=1.2), Item 48 (“Many children with autism get upset if their routine is changed”; MnSq=0.6), and Item 49 (“Autism is due to cold, rejecting parents”; MnSq=0.5) showed misfit (i.e., scores were outside of the expected range) and were flagged. These items were not deleted but flagged for further review in Phase 2.

**Item difficulty**

A variable map of the ASK-Q items was visually examined (available upon request to the first author), which detailed the item and participant locations for the 182 police officers who completed the ASK-Q. Specifically, this map was explored to determine whether the items represented an appropriate range of easy to difficult items. Figure 2 shows the items on the ASK-Q according to their order of difficulty, with the easier items at the bottom and the more difficult items at the top. Overall, the results indicated an acceptable range of item difficulty. The difficulties of the items were compared to the abilities of the participants. Evidence showed that more items were easier to endorse (or to answer correctly) than were difficult to endorse. For example, Item 20, “Children with autism do not enjoy the presence of others,” was relatively more difficult to answer correctly. For the ASK-Q, “difficult to endorse” indicates that an item would require more of the latent trait (e.g., autism knowledge) to answer correctly. That is, police officers who demonstrated more ASD knowledge would be more likely be able to answer a difficult item correctly, whereas police officers who demonstrated less ASD knowledge would be less likely to answer that item correctly. For example, Item 48, “Many children with autism get upset if their routine is changed,” was easy to endorse.

**Convergent Validity Evidence**

Research Question 3 explored the association between the two primary variables in this study. For this analysis, the two variables (e.g., PSEA and ASD knowledge) were treated as latent variables and analyzed in Mplus 8.3 by correlating the latent factors. Results indicated that there was a significant positive relationship between ASD knowledge and ASD self-efficacy ( $r=0.35$ , 95% CI [0.33, 0.38]).



**Fig. 2** Phase 1 Wright Map from ASK-Q Rasch analysis. More difficult items are presented at the top of the map. Less difficult items are presented at the bottom of the map. Similarly, more knowledgeable police officers are at the top of the map, and less knowledgeable police officers are at the bottom of the map. A “1” is used to represent one participant

**Summary of Instrument Modifications Prior to Phase 2**

Three major modifications were made to the PSEA scale prior to data collection in Phase 2. First, two items (Items 6 and 7) were removed. This decision reflected the iterative process of instrument development and was based on a review with a team of experts who identified possible problematic wording. Second, Item 13 was modified as a result of empirical evidence (i.e., weak factor loading) and further consultation with experts.

Finally, the response format was changed before Phase 2 data collection. This modification was supported by a review

of the response categories used and by consultation with a team of experts from a university psychometrics research lab. The team reviewed the response format and contemplated modification options that might improve discrimination among participants. A change in response format was proposed because the majority of the officers answered in Categories 3 (*Somewhat Agree*) and 4 (*Strongly Agree*). The difference between the two middle categories (*Somewhat Agree & Somewhat Disagree*) may have also been difficult to discern. Further, asking officers to “agree” to an item that describes a behavior may be more confusing than directly asking for a judgment of their own capabilities.

Bandura (2006) called for a response format that permits participants to judge their own efficacy with “intermediate degrees of assurance” (p. 312). After consulting with experts, we determined that the self-efficacy instrument would benefit from a response format that was more closely tied to self-efficacy theory. The response format was changed for Phase 2 as follows: 1 (*I cannot do that*), 2 (*I doubt I can do that*), 3 (*I’m fairly certain I can do that*), and 4 (*I can do that*). This modified response format was reviewed with experts in policing to verify that officers would find the format easy to understand. We hypothesized that the change in response format may provide additional item-level variability, as officers would more easily respond to the items. No changes were made to the ASK-Q in Phase 2.

## Phase 2

The aim of the Phase 2 was to evaluate further the psychometric properties of the PSEA scale with a new sample of 438 police officers. Given substantial changes to the items after Phase 1 (i.e., change in response format, item deletion, and additional items), an EFA was appropriate for examining the structure of the data in Phase 2. Item-level descriptive data were reviewed for the 13 items used in Phase 2. No univariate outliers were identified, the skewness and kurtosis values were acceptable, and the polychoric correlation matrix showed that all items were intercorrelated above 0.30. An examination of the frequency distributions of each item revealed that Category 3 and 4 were still used most often. Item 10 (“I can seek appropriate information from a caregiver when trying to learn more about someone with autism”) was the least discriminating item and Item 11 (“I can gather identifying information from someone with autism who does not use verbal speech”) was one of the most discriminating items.

Next, an EFA was conducted to explore the internal structure of the PSEA scale.

Preliminary statistics were gathered to determine the appropriateness of the EFA. The Kaiser–Meyer–Olkin measure of sampling was 0.905, which is above the recommended value of 0.50 (Williams et al. 2012). Bartlett’s test of sphericity was statistically significant (2052.51,  $p < 0.001$ ). Results of Horn’s (1965) parallel analysis revealed that a unidimensional solution represented the 13-item PSEA scale. All items loaded heavily ( $\lambda \geq 0.50$ ) on the single factor (see Table 3). Internal consistency for the 13 items was  $\omega = 0.89$  bootstrap corrected

**Table 3** Exploratory factor analysis results and Phase 2 items (N = 438)

Item	$\lambda$	$h^2$
1. I can identify some signs of autism when I observe them	0.84	0.71
2. I can de-escalate a situation in which a person with autism is harming others	0.80	0.64
3. I can de-escalate a situation in which a person with autism is harming himself or herself	0.76	0.58
4. I can explain at least three general characteristics of a person with autism to another police officer who asks	0.71	0.50
5. I can distinguish autism from other disabilities	0.63	0.40
6. I can tell the difference between someone who has autism and someone who is demonstrating drug-induced behavior	0.54	0.29
7. I can adapt the way I communicate to explain something to a person with autism	0.72	0.52
8. I can establish rapport with someone who has autism	0.72	0.52
9. I can use what I know about autism to help find an individual with autism who has become a missing person	0.70	0.49
10. I can seek appropriate information from a caregiver when trying to learn more about someone with autism	0.64	0.41
11. I can gather identifying information from someone with autism who does not use verbal speech	0.61	0.37
12. I can inform a concerned citizen about autism	0.71	0.50
13. I can modify the environment to help an individual with autism feel calm during an emergency	0.71	0.50

$h^2$  = communalities,  $\lambda$  = standardized factor loadings, 69.92% of common variance was explained by the factor solution. Respondents replied using a 4-point Likert-type response format that ranged from 1 (*I cannot do that*) to 4 (*I can do that*). The stem for each item was “When working as a police officer.”

[BC] 95% CI [0.86, 0.91]. All 13 items were deemed acceptable for final version of the scale (see Table 3).

### Psychometric Properties of the ASK-Q

A secondary goal of Phase 2 was to replicate the analyses completed on the ASK-Q in Phase 1. The 48-item ASK-Q was presented to participants in Phase 2. Results of the R-PCA in Phase 2 indicated that 48.0% of the variance was explained by the ASK-Q model. An examination of contrasts revealed that the unexplained variance was less than 3% for all contrasts. These results were similar to the dimensionality findings in Phase 1. Person separation reliability for the questionnaire was consistently satisfactory at 0.83. Item separation reliability was also found to be acceptable at 0.99. Finally, the overall internal consistency was good ( $\alpha=0.92$ ).

### Instrument Refinement

Results of the Phase 2 Rasch analyses showed that one of the original five misfitting items, Item 29, continued to demonstrate misfit (“Autism is a communication disorder”). Because this item demonstrated misfit in both phases, a 47-item version of the ASK-Q (without Item 29) and a 48-item version of the ASK-Q (with Item 29 included) would be examined in the correlation analyses to determine the impact Item 29 had on the overall instrument (see Table 4).

### Convergent Validity Evidence

Again, in Phase 2, we used latent variable correlations to evaluate the association between police officer self-efficacy for working with individuals with ASD and police officer knowledge of ASD. The variables were significantly positively correlated ( $r=0.46$ , 95% CI [0.42, 0.49]); this relationship did not change when the 47-item ASK-Q items were used.

### Summary of Instrument Modifications After Phase 2

Following Phase 2, no further changes were made to the PSEA scale. One item (e.g., Item 29) on the ASK-Q was flagged in both phases; however, we elected to retain this item because a sensitivity analysis revealed no differences between the 47-item ASK-Q and the 48-item ASK-Q.

### Discussion

Bandura (1997) stated, “Analyses of how efficacy beliefs affect actions rely on microanalytic measures rather than global indices of personality traits or motives of effectance”

**Table 4** Fit of items of the ASK-Q to the Rasch model in both phases

Items	Phase 1 ( $N=182$ )		Phase 2 ( $N=438$ )	
	Infit MnSQ	Infit ZSTD	Infit MnSQ	Infit ZSTD
ASKQ_2	0.9	-0.4	1.1	0.9
ASKQ_3	<b>0.6</b>	<b>-1.5</b>	0.9	0.0
ASKQ_4	1.1	1.1	0.1	-0.4
ASKQ_5	0.7	-1.5	0.9	-0.5
ASKQ_6	1.1	0.5	0.9	-0.9
ASKQ_7	0.9	-0.2	0.8	-1.1
ASKQ_8	1.1	1.5	1.1	1.5
ASKQ_9	0.9	-0.4	1.1	0.3
ASKQ_10	1.2	1.1	1.0	0.0
ASKQ_11	0.9	-0.2	0.9	0.0
ASKQ_12	0.9	-0.2	0.9	-0.1
ASKQ_13	1.0	0.0	1.1	1.0
ASKQ_14	0.9	-0.2	1.0	-0.1
ASKQ_15	1.1	0.8	1.0	0.3
ASKQ_16	1.1	1.0	1.1	0.8
ASKQ_17	1.0	0.2	0.8	-1.1
ASKQ_18	1.3	1.2	0.9	-0.7
ASKQ_19	1.0	0.2	0.9	-0.8
ASKQ_20	1.0	-0.2	1.1	0.9
ASKQ_21	1.1	0.3	1.0	0.2
ASKQ_22	1.1	0.9	1.0	0.5
ASKQ_23	1.0	0.1	0.9	-0.5
ASKQ_24	1.0	0.0	1.0	-0.2
ASKQ_25	1.1	0.8	1.1	1.5
ASKQ_26	<b>0.7</b>	<b>-1.4</b>	0.7	-1.2
ASKQ_27	1.0	0.0	0.7	-1.1
ASKQ_28	1.0	-0.2	1.0	-0.6
ASKQ_29	<b>1.2</b>	<b>3.2</b>	<b>1.2</b>	<b>5.0</b>
ASKQ_30	1.0	0.1	1.1	0.4
ASKQ_31	1.1	1.5	1.1	1.7
ASKQ_32	0.8	-1.3	1.0	0.1
ASKQ_33	0.7	-0.9	0.8	-1.1
ASKQ_34	0.9	-0.5	1.0	0.3
ASKQ_35	1.0	0.6	1.1	2.1
ASKQ_36	0.8	-0.8	0.8	-0.6
ASKQ_37	1.0	-0.1	0.8	-1.1
ASKQ_38	1.1	0.4	1.0	0.3
ASKQ_39	1.1	0.7	1.1	0.6
ASKQ_40	1.0	0.3	1.1	1.7

(p. 14). The purpose of this study was to develop such a “microanalytic measure” that would be appropriate for assessing the self-efficacy of police officers when working with individuals with ASD. The final set of self-efficacy items was created based on a rigorous process that considered the opinions of police officers, the recommendations of families of individuals with ASD, suggestions from experts in self-efficacy and psychometrics, and empirical evidence

from two separate samples of police officers. ASD experts' opinions were incorporated to confirm that items appropriately reflected the multifaceted nature of ASD as even ASD experts may find it difficult to identify ASD in all individuals. Learning to interact appropriately with someone with ASD can be a challenging task. Overall results of this study revealed that the instrument could be used to assess police officer self-efficacy for working with individuals with ASD, although additional psychometric evidence should be gathered in future studies with diverse samples.

A descriptive analysis of the frequency distributions of the PSEA scale revealed that officers were highly confident in their ability to work with individuals with ASD. Two items (e.g., Item 1 and Item 12) in particular highlighted this pattern of result, as less than 15 officers responded in Categories 1 (*Strongly Disagree*) and 2 (*Somewhat Disagree*) indicating that they did not feel confident about their interactions with individuals with ASD. This pattern of response could indicate that the officers answered the items in a self-enhancing or socially desirable way. Another possibility is that the response pattern reflects a selection bias in the sample. That is, officers who responded to the study invitation may have had greater familiarity with individuals with ASD and therefore were truly more self-efficacious for working with individuals with ASD. To understand more about these results and to ensure that the items on the PSEA scale discriminate between officers of varying backgrounds and experiences, additional item-level analyses (e.g., Rasch analyses) are recommended.

This study sought to explore additional psychometric properties of the police self-efficacy instrument (i.e., the PSEA scale) and the ASD knowledge scale (i.e., ASK-Q) as well as to analyze the association between the two instruments. Results of both phases provided evidence that the items on the PSEA scale and the items on the ASK-Q reflected unidimensional constructs. A total score is appropriate for use when using the instruments to measure the constructs of interest. This was specifically important for the ASK-Q, as Harrison et al. (2017) had previously suggested that the ASK-Q items reflected a multidimensional construct. Our findings indicate that, at least among the U.S. police officers who elected to take part in this study, the ASK-Q items represent a single knowledge construct.

Items on the ASK-Q were examined in more detail to ensure that all items contributed to the construct. Item 29 (“Autism is a communication disorder”) was flagged as a misfitting item in both phases. To understand the impact this item had on the overall instrument, two correlation analyses were conducted – one that included the item (48-item ASK-Q) and one that excluded it (i.e., 47-item ASK-Q). Because there was no difference in the correlation results, the questionable item was retained. However, in future investigations, researchers can more critically examine this item's

wording and contribution to the overall construct. A method such as cognitive interviewing could be used to understand how participants are responding to the item and offer suggestions for improvement in the wording or phrasing.

The association between self-efficacy and knowledge of ASD was also explored. As hypothesized, results indicated that when officers reported more knowledge of ASD, they also reported higher levels of self-efficacy for working with individuals with ASD. The correlations were consistent in Phase 1 and Phase 2, although the coefficient obtained in Phase 2 was slightly higher. This could indicate that the changes made to the instrument between Phase 1 and Phase 2 helped to better capture the PSEA construct.

According to Bandura (1986), individuals do not only need the knowledge and skills to work with people with ASD, they also need belief in their own capabilities to demonstrate those skills. Knowledge and self-efficacy contribute to individuals' personal agency. In this study, officers who reported lower levels of self-efficacy for working with individuals with ASD were found to report less accurate knowledge of ASD. This finding is consistent with previous research in similar fields such as education (Lauermaann and König 2016) and medicine (Rimal 2000) where participants who reported more domain-specific knowledge also reported more domain-specific self-efficacy. Finding a consistent association between these constructs as found in other fields (e.g., teaching and medicine) helps to provide content validity evidence for the newly developed self-efficacy instrument, providing evidence that the instrument is covering the content intended to be measured in this construct.

In Bandura's (1997) social cognitive theory, self-efficacy is considered a “generative capability,” or one that drives a person to behave and execute skills under a variety of tasks (p. 36). Self-efficacy is a powerful self-evaluation that has been shown to influence how an individual might view a difficult task (Bandura 1997). Police officers who report higher levels of self-efficacy for working with individuals with ASD may take on working with this group of community members more readily than officers who feel they do not have the skills needed to work with such individuals. Although this study only provided a means of measuring police officer self-efficacy, the instrument could be used in future explorations to test this hypothesis.

Interventions designed to increase knowledge of ASD have been a focus of recent international research (e.g., Harrison et al. 2016; Railey et al. 2020a, b). However, this area of research is still novel and rigorous demonstrations of validity and reliability have not yet been provided for most established measures of ASD knowledge, as studied by Harrison et al. (2016/17). Once the trainings are designed, a change in officers' capability judgments can serve as evidence of intervention efficacy, as demonstrated in studies in related fields (e.g., Sheeran et al. 2016). Researchers could



assess the extent to which trainings help officers feel more capable and skilled in their interactions with individuals with ASD. After further validity testing including confirmatory factor analysis, the instrument can be used before and after the training to help educators assess the change in how capable officers feel interacting with individuals with ASD in their communities.

Police officers' efficacy beliefs can affect whether they will change their behavior and whether they will be motivated to persevere in a new situation (Bandura 1997). For example, if an officer were to conduct a traffic stop involving an individual with ASD and correctly suspect the individual's diagnosis, they may be able to more effectively handle the situation if they held a positive belief in their capabilities for working with individuals with ASD. The association between self-efficacy and the behavior of police officers, however, has yet to be explored. Currently, the hypothesis that police officer self-efficacy will affect police officer behavior is theoretical, based on Bandura's (1986) social cognitive theory. This study provides initial psychometric evidence for the instrument and allows for future explorations of this kind.

## Limitations

This project was an initial instrument development study for an instrument designed to measure police officer self-efficacy for working with individuals with ASD. The work was limited in several ways. First, this study relied entirely on the use of self-report data, which can be influenced by social desirability, or participants' tendencies to answer the items in the way they feel is socially appropriate. In addition, recruitment for this study was not at random and the participants who took the survey may not be representative of the broader population of police officers in the United States. For example, as noted above, police officers were told that the study was about police officers and individuals with ASD. Because officers could choose to respond, it is possible that only officers who knew something about ASD responded, which limits the external validity of this study. To avoid this potential bias, the PSEA scale could be sent to police officers at random to better reflect the whole population of officers. The EFA was also repeated in two phases, which is an acceptable method for increasing generalizability of results and the method employed.

Finally, the response rate within police departments who agreed to participate was low (often less than 10%). Although this response rate is common among studies seeking self-reports (Sheehan 2001) and with electronic/web surveys (Fan and Yan 2010), this low response rate could have biased the results of this study. The incentive for survey distribution was targeted at police chiefs, as participating departments were offered a free training in exchange

for sending out the survey to their officers. An incentive that targeted the officers may have been more effective in increasing the participation rate. Collecting data in person and instructing all police officers to participate may minimize the bias inherent in volunteer participation.

## Conclusion

An article from Phoenix, Arizona, on September 19, 2017, detailed an incident in which a police officer detained an individual with ASD because he misinterpreted his behaviors and believed the individual's rigid and unfamiliar movements were a sign of drug intoxication. The bodycam captured footage of the exchange between the officer and individual, and the family released photos of the boy's injuries from the brief detainment (Helsel 2017). A more serious incident involving a shooting occurred in 2016 in Florida when a young person with ASD was receiving assistance from his caretaker and an officer misinterpreted the individual as being "armed and suicidal" (Silberman 2017). Unfortunately, these incidents are not anomalies, and simple interactions between police officers and persons with ASD are becoming news headlines because of a misinterpretation of behaviors. The PSEA scale was designed in response to these incidents as a tool to measure officer beliefs that they can effectively work with this group of community members. It is worthwhile to pursue research that directly measures police officers' beliefs about working with individuals with ASD to help design and understand police training effectiveness, planned as a proactive response to incidents like this across the country.

**Author contributions** AL was the primary investigator of the project and devised the project, planned the logistics, and conducted the analyses. EU supervised the project from conceptualization to writing the manuscript. MT provided expertise in the area of psychometrics and gave a critical review of the analyses and full manuscript. JC, AS, and KS provided guidance in diverse ways including contributions to the original conceptualization, reflections on the results, writing, and critical feedback throughout.

## Compliance with Ethical Standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

**Research Involving Human Participants and/or Animals** The questionnaire and methodology for this study was approved by the Human Research Ethics committee of the University of Kentucky (Ethics Approval Number: 43388.).



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