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<http://dx.doi.org/10.1002/ab.21468>

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# Development and Confirmatory Factor Analysis of the Non-Violent and Violent Offending Behavior Scale (NVOBS)

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The purpose of this research was to develop a psychometrically sound measure of violent and non-violent offending, suitable for both male and female participants in general (non-forensic) samples. Potential items were selected from existing measures. A sample of 653 British university students completed all items, and their responses were analyzed using exploratory factor analysis and validated with confirmatory factor analysis. There were five separate factors (general violence, drug-related offenses, partner violence, theft, and criminal damage), which were confirmed with acceptable fit indices. The five-factor model applied to both males and females. Each subscale demonstrated good internal consistency, with alphas for each factor ranging from moderate to good. This new measure is a potentially valuable research tool for investigating people's involvement in violent and non-violent offending. The importance of examining the psychometric properties of scales, and confirming the category groupings using CFA of the items is outlined. *Aggr. Behav.* 9999: XX–XX, 2013. © 2013 Wiley Periodicals, Inc.

**Keywords:** domestic violence; general violence; offending; sex differences; scale development

## INTRODUCTION

[General](#)<sup>Q2</sup> violence and non-violent behavior are frequently examined together in the criminological literature. Intimate Partner Violence (IPV) is generally studied separately from other types of crime as it is perceived to be a unique and specialist type of crime warranting its own research, theories and interventions (Daly & Wilson, 1988; Dobash & Dobash, 1992; Hotaling, Straus, & Lincoln, 1990; Gelles & Straus, 1979; Giles-Sims, 1983). In contrast with this, Gottfredson and Hirschi (1990, 2007) concluded that offenders have a propensity to commit a wide variety of criminal acts, and specialism in one type or another is quite rare. Similarly, the longitudinal research by Farrington et al. (2006) found that self-reported offenders tended “to be deviant in many aspects of their lives.” A review of criminal careers research (DeLisi & Piquero, 2011, p. 291) again found that “virtually all offenders are generalists.” These sources all suggest that offenders are likely to be criminal generalists rather than specialists, and that the perpetration of violent and non-violent offending is likely to overlap. There is at present no comprehensive measure that combines both violent and non-violent offenses. It was the purpose of this study

to design such a measure so as to facilitate research on the generality of offending.

## Measuring IPV, Violent, and Non-Violent Crime

Although the three offense areas are usually studied separately, some research has examined them together. Moffitt, Kreuger, Caspi, and Fagan (2000) investigated partner violence and general crime in 21-year-old men and women. Partner violence was measured using 13 items which consisted of the nine physical assault items from the original Conflict Tactics Scale (Straus, 1979), plus four new items, involving twisting the partner's arm, forced sex, shaking the partner, and throwing you are the partner bodily (Moffitt et al., 1997). The Self-Report Delinquency interview was used to measure general crime. General violence was measured using five items. Non-violent offending was split into three categories; theft (12 items), fraud (9 items), and vice (23 items). The

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Received 20 July 2012; Accepted 17 December 2012

Published online in Wiley Online Library (wileyonlinelibrary.com). DOI: 10.1002/ab.21468

1 researchers found that many perpetrators of partner  
2 violence also engaged in physical aggression towards.

3 Straus and Ramirez (2004) investigated the violent and  
4 non-violent criminal history of male and female IPV  
5 perpetrators. They measured partner violence using the  
6 12-item physical assault scale from the CTS2 (Straus,  
7 Hamby, Boney-McCoy, & Sugarman, 1996). These 12  
8 items consisted of 5 minor assault items and 7 severe  
9 assault items. Criminal history was measured by four  
10 items, two involving violent crime (physical attack  
11 and carrying a hidden weapon), and two involving  
12 stealing. These four questions were asked for crime  
13 perpetrated before and after age 15, so that there were  
14 eight items in total. The research found that a prior  
15 criminal history predicted IPV perpetration, and the  
16 relationship was stronger for prior violent crime than for  
17 property crime.

18 Where previous research has involved the three offense  
19 types (violent, partner violent and non-violent crime)  
20 different measures, with different response formats have  
21 been used to assess each one, with some being very brief  
22 (e.g., Straus & Ramirez, 2004). The problem with using  
23 different measures with different response formats is that  
24 the results are not directly comparable as there will be  
25 different variance in the units of measurement for each  
26 variable, which introduces different elements of mea-  
27 surement error and bias. The problem with using scales  
28 with different numbers of items is that it is not possible to  
29 ascertain if the higher prevalence or frequency of  
30 offending is simply due to there being more items on  
31 that particular scale. It is also difficult to compare  
32 between different offenses if different measures have  
33 been used. Other potential problems include not separat-  
34 ing general violence and non-violent offending (e.g.,  
35 Moffitt et al., 2000), precluding the exploration of  
36 differences between general violence and non-violent  
37 crimes. The current study seeks to overcome these limita-  
38 tions by creating a scale that allows the three offense  
39 types to be measured and analyzed as three separate  
40 domains.

41 Although there are other comprehensive measures,  
42 such as the British Crime Survey (BCS) for the UK, the  
43 National Crime Victimization Survey (NCVS) for the  
44 US, and the Uniform Crime Reporting Survey (UCRS)  
45 for Canada, the questionnaire developed in this study is  
46 much shorter and more suitable for use in psychological  
47 research, where it can be administered alongside other  
48 measures. Problems associated with the existing meas-  
49 ures include the national crime surveys only measuring  
50 crimes that have a direct victim, so that victimless crimes  
51 (such as drug taking) are excluded. These are included  
52 in the current measure, making it a more comprehen-  
53 sive assessment of self-reported offending behavior.  
54 Crime surveys measure only crime victimization,

whereas the current questionnaire also measures offense  
perpetration. It therefore provides a comprehensive  
measure for use in psychological research.

To overcome the limitations in existing measures,  
outlined above, a measure is required which has  
comparable questions for all three offense types, which  
uses the same response method throughout, and has a  
wide variety of criminal acts included, so that the profile  
of men's and women's offending can be adequately  
captured. The current research involves the development  
of such a scale.

### The Overlap

This divide between research on IPV and other crime  
may be borne out of feminist conceptualizations, where  
IPV, unlike other violent and non-violent crime, is  
viewed as being uniquely the consequence of patriarchy,  
and is therefore solely (or largely) regarded in terms of  
men aggressing against women (e.g., Dobash &  
Dobash, 1980, 1998, 2004; Dobash, Dobash, Cavanagh,  
& Lewis, 1998; Dobash, Dobash, Wilson, & Daly, 1992;  
Henning, Jones, & Holdford, 2003). The evolutionary  
view parallels this, highlighting the uniqueness of  
intersexual aggression as the consequence of mate-  
guarding arising from paternity uncertainty (e.g., Wilson  
& Daly, 1992, 1996). From both the feminist and  
evolutionary perspectives, IPV is portrayed as a unique  
and specialized crime due to victim choice, in that victims  
are female and in an intimate relationship with a male  
perpetrator (but see Archer, 2012; Felson, 2002; Graham-  
Kevan & Archer, 2009).

In contrast, research from a more psychological or  
criminological perspective has recognized the heteroge-  
neity of IPV perpetrators, with some being exclusively  
violent within their intimate relationship and others being  
violent in more than one context, that is, their violence is  
not limited to their partner but occurs out of the home as  
well. Research dating back to the 1980s (e.g., Cadsky &  
Crawford, 1988; Fagan, Stewart, & Hansen, 1983;  
Gondolf, 1988; Shields, McCall, & Hanneke, 1988)  
has identified this overlap in the perpetration of general  
violence and IPV. These classifications have more  
recently been confirmed for both male (Holtzworth-  
Munroe, Meehan, Herron, Rehman, & Stuart, 2000) and  
female (Babcock, Siard, & Miller, 2003) perpetrators.  
Babcock et al. (2003) concluded that the findings for  
women parallel those for men, with perpetrators of IPV  
being a heterogeneous group. Male typologies of violent  
behavior have been developed and extensively re-  
searched (e.g., Holtzworth-Munroe & Stuart, 1994),  
but consideration of female typologies and how they  
relate to the male research is sparse. Although an  
association between types of violent offending has long  
been identified, investigation into the overlap of

offending behavior in men and women has largely been neglected, particularly for women.

### Risk Factors for IPV, Violent, and Non-violent Crime

Previous research has examined the criminal histories of men and women who perpetrate IPV, and has found that a substantial subgroup of these men and women have prior convictions for crimes unrelated to partner abuse (Babcock et al., 2003; Busch & Rosenberg, 2004; Buzawa, Hotaling, Klein, & Byrne, 1999; DeLucia, Owens, Will, & McCoin, 1999; Henning & Feder, 2004; Moffitt et al., 2000, 2001). This research provides evidence for the interrelatedness of the three different types of crimes, and provides a rationale for assessing them all in the same sample.

Additionally, research has shown that risk factors for aggressive and antisocial behavior tend to be shared by both boys and girls (Broidy<sup>Q3</sup> et al., 2003; Côté, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Moffitt et al., 2001), and that the same influences predict both general and partner aggression in men and women (Moffitt et al., 2000; Tremblay et al., 2004). These shared risk factors include low self-control, negative emotionality, low intelligence and empathy deficits, and suggest that the different forms of aggression are developmentally similar and likely to co-occur.

Aggressive adults are highly likely to have a history of aggressive behavior beginning in childhood (Conradi, Geffner, Hamberger, & Lawson, 2009; Hay, 2005). Longitudinal research has found that men and women with a history of conduct problems are more likely to enter into a relationship with a violent partner, and are likely to perpetrate violence towards their partners, in excess of their own victimization (Moffitt et al., 2001), suggesting that IPV “is but another expression of an earlier emerging antisocial propensity” (Moffitt et al., 2001, p. 65). Longitudinal data have demonstrated that the overlap between IPV and general violence perpetration is similar for men and women, showing that partner-violent men and women at age 21 were more likely to aggress against non-family members than those who were non-violent to their partners (Moffitt et al., 2000). This research demonstrates that different types of aggressive and antisocial behaviors share similar risk factors and are likely to co-occur in both sexes.

### Studying Violent and Non-Violent Offending of University Students

Although students are generally thought to be relatively law-abiding, especially with regards to violent crime, there is one violent crime which has been found to be prevalent in student populations, and that is IPV (e.g., Fiebert & Gonzalez, 1997; Foo & Margolin, 1995;

Nabors, 2010; Riggs & O’Leary, 1996; Straus, 2008; Straus & Ramirez, 2004; White & Koss, 1991). Therefore, using this population allows us to examine the overlap of self-reported offending in a non-selected sample. Although violent and non-violent crime in university students may be low compared with other populations, research shows that these behaviors are present: they may just be less frequent in students. Therefore, other samples are likely to show similar patterns of offending, only at higher rates. Statistics show that students form quite a large part of the population in many countries, for example, in the UK there are approximately 2.5 million students (Higher Education Statistics Agency: HESA, 2011). Universities are employing strategies to widen participation to make university more accessible to underrepresented groups, and HESA collects and provides statistics on this. The university that this sample was taken from is above the UK average for widening participation to underrepresented groups, including those from low participation neighborhoods (top 10), and those from lower socioeconomic statuses (top 25) (HESA, 2011). Therefore, the population from which the current sample was derived has a reasonably wide demographic representation for a University sample.

In summary, the aim of this research is to create a psychometrically sound scale that allows the separate assessment of violent and non-violent offending in men and women. To achieve this, we conducted exploratory factor analysis, and then confirmatory factor analysis, on the Non-violent and Violent Offending Behavior Scale (NVOBS: Thornton, Graham-Kevan, & Archer, 2010) for men and women, together and then separately, to create a scale appropriate for use with both sexes. Additionally the scale was assessed for reliability.

## METHOD

### Item Selection

Potential items were selected by reviewing existing measures of delinquency (which included items relating to general violence and non-violent offending) and partner violence and, in order to include a broad range of both violent and non-violent criminal acts (e.g., Bendixen & Olweus, 1999; Borjesson, Aarons, & Dunn, 2003; Dahlberg, Toal & Behrens, 1998; Huizinga, Esbensen, & Weiher, 1991; Mak, 1993; Moffitt & Silva, 1988; Moffitt et al., 1997; Straus, 1979; Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Initially, 119 items were selected from the literature review and a pilot study was conducted to investigate the prevalence of the behaviors in women as violent and criminal scales tend to be developed on men. A number of items from the earlier measure used in the pilot study were eliminated due to

very low endorsement (endorsed by <1% of the sample; e.g., Used a weapon on someone, Choked partner, Sold cocaine, Arson, Stole over £100), suggesting that these behaviors may not be characteristic of university students. Therefore, a final pool of 70 items was generated and used in the current research. The general violence and IPV items were duplicates of each other in order that the same items were captured. Items were adapted for use in the current study so that they all had the same response options.

### Data Collection

Data were collected from a total of 653 participants (300 [45.9%] men and 353 [54.1%] women). A subset of the present sample was published as a study investigating predictors of offending (Thornton, Graham-Kevan, & Archer, 2010). The present analysis does not overlap with what was reported there. The study was approved by the University of Central Lancashire Ethics Committee. Participants were either undergraduate or postgraduate students from a variety of courses, recruited on campus at a British university. Inclusion criteria comprised: being in a heterosexual relationships for at least one month in the past 12 months, and being over 18 years of age. Age ranged from 18 to 56 and the mean age was 22.14 years (men: 22.22; women: 22.08). It is important that men and women were matched for age as research has shown that violence (e.g., Archer, 2004) and offending (Gottfredson & Hirschi, 2007) decrease with age: therefore failure to match men and women on age could distort sex differences. There was no significant sex difference for age ( $t(651) = .17, P = .87$ ). Participants who consented were administered questionnaires containing the 70 items, and were asked to report the extent to which they had been violent towards their partners, violent towards others, and engaged in non-violent offenses in the past 12 months (see Appendix 1 for instructions to participants). The 12-month time period is commonly used in both studies of IPV (e.g., Straus, 1979; Straus, Hamby, Boney-McCoy, & Sugarman, 1996), and in general aggression research (e.g., Richardson & Green, 1999, 2003). Items were answered on a 7-point scale of 0 (never happened) to 6 (happened more than 20 times). Straus et al. (1996) recommend recoding the responses to weight the data by creating midpoints for each of the items as follows: 4 (3–5 times), 8 (6–10 times), 15 (11–20 times), and 25 (more than 20 times: 25 is an assumed midpoint and is recommended by Straus et al., 1996, p. 305). Therefore, this procedure was adopted here.

## RESULTS

For the purposes of factor analysis, the sample was randomly divided into two sub-samples, one used to

conduct exploratory factor analysis ( $n = 337$ , men = 152, women = 185) and the other used to validate the structure using confirmatory factor analysis ( $n = 316$ , men = 148, women = 168). To examine potential sex differences, exploratory factor analyses were also conducted separately for men and women. The sexes were matched for age within each subsample.

The dataset was initially assessed for suitability for factor analysis. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy ranges from 0 to 1, and the result should be .6 or above to show appropriateness for factor analysis (Field, 2009; Kaiser, 1974; Tabachnick & Fidell, 2007). For this study  $KMO = .76$ , which is above the recommended minimum value. Bartlett's test of sphericity was statistically significant ( $\chi^2(903) = 6515.93, P < .001$ ), indicating that the inter-item correlations were sufficiently large for principal component factor analysis. Therefore, the data are suitable for factor analysis.

A principal component analysis (PCA) with Varimax (orthogonal) rotation was conducted. Oblique rotation (Direct Oblimin) was also tested: however, the inter-factor correlations were all weak (.2 or below). Therefore, the decision to use an orthogonal rotation method was justified (Pedhazur & Schmelkin, 1991).

The number of factors to retain is often determined by a Scree test (Cattell, 1966; Klein, 1994). However, the Scree test can be subject to ambiguity where there is either no clear break in the curve or where there appears to be more than one definite break. Since the Scree plot was ambiguous in this case, Horn's Parallel Analysis was used (Horn, 1965). Parallel analysis (PA) calculates average eigenvalues from a random dataset that is based on the sample size and number of variables contained within the real dataset. The real eigenvalues are then compared with the random eigenvalues, and only those where the actual values are higher than the corresponding random values are retained (see Hayton, Allen, & Scarpello, 2004 for an outline of the PA procedure). Following parallel analysis, five factors were retained for the final solution. Together these five rotated factors explained 42.95% of the total variance. By studying the items that load on to each factor, the five factors were labeled, as (1) general violence, (2) drug-related offenses, (3) IPV, (4) criminal damage, and (5) theft. Only items which loaded  $>.4$  on to at least one factor (Stevens, 1992) were retained, and no items loaded on more than one factor. Factor 1 (general violence) contained 12 items, factor 2 (drugs) contained 5 items, factor 3 (IPV) contained 8 items, factor 4 (criminal damage) contained 4 items, and factor 5 (theft) contained 4 items. Because each factor is measuring a different offense related dimension, the factors will now be referred to as subscales. The factor loadings for each item, along

with Eigenvalues and percentage variance explained by each subscale, are displayed in Table 1 for the final rotated solution.

Reliability analysis was used to measure the internal consistency of the subscales. Cronbach's alpha coefficient ( $\alpha$ ) is one of the most popular indicators of internal consistency (Field, 2009). Alphas for each subscale on the NVOBS ranged from acceptable to good, since all were above .7 (see Table 1). To examine potential sex differences, exploratory factor analyses were also conducted separately for men and women. Examination of the factor compositions and percentage variance explained suggested similarities between the sexes: therefore, data were combined for men and women.

### Confirmatory Factor Analysis

The model fit of the five-factor solution was tested using confirmatory factor analysis, performed using AMOS version 18.0. Item parcels were used to reduce the number of individual items entered into confirmatory factor analysis, in order to increase the stability of parameter estimates (Holt, 2004). To create parcels, scale items were bundled by averaging items. Averaging keeps the means more interpretable and comparable regardless of the number of items in the bundle. One of the chief advantages of parceling is that it improves the subject to variable ratio. Table 1 shows the parcel placement for each item. Model fit was assessed using comparative fit index (CFI), root mean square error of approximation (RMSEA), and goodness of fit index (GFI). The current model was recursive and identified. Confirmatory factor analysis produced a model of good fit ( $\chi^2 = (55) 147.90$ ,  $P < .001$ , RMSEA = .07, GFI = .94, CFI = .94). For completeness, the model fit of the three factor (general violence, IPV, and non-violent offending) conceptual model suggested in the introduction was also tested. The results showed that the three factor model was not as good a fit to the data as the five-factor model ( $\chi^2 = (62) 303.00$ ,  $P < .001$ , RMSEA = .08, GFI = .91, CFI = .91). Therefore, the five-factor model was selected as the final model.

### Further Analyses of the NVOBS Subscales

Subscales were derived from the factors by totalling the items for each of the five resulting offending behavior subscales. The subscale totals were screened for outliers and normality (Tabachnick & Fidell, 2007). Outliers were reduced so that extreme scores were one more than the next most extreme score. Descriptive statistics are provided for each subscale (i.e., general violence, drug-related behavior, IPV, criminal damage, and theft) in Table 2.

It is evident from Table 2 that the data are over-dispersed (standard deviations are higher than the

**TABLE 1. Results of Principal Components Factor Analysis With Varimax Rotation ( $n = 337$ ) of NVOBS for Men and Women Showing the Final Five-Factor Solution<sup>a</sup>**

Item	Rotated Factor Loadings	Parcel
<b>Factor 1. General Violence (GV: 12 items)</b>		
1. Kicked someone	.85	GV1
2. Hit someone with a fist	.77	GV1
3. Pushed grabbed or shoved someone	.75	GV1
4. Beat someone up	.70	GV2
5. Scratched someone	.67	GV2
6. Slammed/held someone against a wall	.65	GV2
7. Hit or tried to hit someone with something hard besides a fist	.63	GV3
8. Bit someone	.61	GV3
9. Threw something at someone	.61	GV3
10. Slapped someone	.58	GV4
11. Twisted someone's arm or hair	.57	GV4
12. Bent someone's fingers	.54	GV4
Eigenvalue	6.32	
% Variance explained	14.71	
$\alpha$	.89	
<b>Factor 2. Drugs (5 items)</b>		
13. Used ecstasy	.84	D1
14. Used cocaine/crack	.79	D1
15. Used speed	.77	D1
16. Used cannabis	.73	D2
17. Gang of 3 + fighting, causing damage/disturbance	.61	D2
Eigenvalue	3.48	
% Variance explained	8.09	
$\alpha$	.79	
<b>Factor 3. IPV (8 items)</b>		
18. Kicked partner	.79	IPV1
19. Hit partner with fist	.76	IPV1
20. Slapped partner	.75	IPV1
21. Bent partners fingers	.68	IPV2
22. Threw something at partner	.63	IPV2
23. Pushed grabbed or shoved partner	.48	IPV2
24. Scratched partner	.45	IPV3
25. Twisted partners arm/hair	.43	IPV3
Eigenvalue	3.37	
% Variance explained	7.83	
$\alpha$	.74	
<b>Factor 4. Criminal Damage (CD: 4 items)</b>		
26. Damaged something in a public place	.67	CD1
27. Graffiti	.62	CD1
28. Broke windows of empty building	.55	CD2
29. Damaged others property on purpose	.46	CD2
Eigenvalue	2.90	
% Variance explained	7.74	
$\alpha$	.71	
<b>Factor 5. Theft (T: 4 items)</b>		
30. Stole 5-50	.67	T1
31. Stole <5	.66	T1
32. Possessed stolen property	.48	T2
33. Enter building to steal/damage	.44	T2
Eigenvalue	2.40	
% Variance explained	5.58	
Overall $\alpha$	.70	

<sup>a</sup>Alphas were for scales based on the factors.

**TABLE 2. Means and Standard Deviations of NVOBS Subscales Overall and by Sex ( $n = 653$ ), and  $\chi^2$  and  $d$  for Sex Differences**

Factor	Overall		Men		Women		$\chi^2$	$d^a$
	Mean (SD)	Range (%)	Mean (SD)	Range (%)	Mean (SD)	Range (%)		
GV	7.85 (11.13)	0–39 (30.2%)	10.44 (12.26)	0–39 (23.7%)	5.65 (9.55)	0–23 (35.8%)	21.89 (1)*	.43
IPV	1.74 (3.01)	0–11 (57.8%)	0.84 (1.85)	0–9 (69.3%)	2.51 (3.55)	0–11 (48%)	51.32 (1)*	-.59
Drugs	2.40 (4.24)	0–16 (61.3%)	3.64 (5.52)	0–16 (56.3%)	1.99 (3.73)	0–12 (65.4%)	10.97 (1)*	.35
CD	0.79 (1.62)	0–5 (74%)	1.12 (1.86)	0–5 (64.7%)	0.50 (1.31)	0–5 (81.9%)	16.66 (1)*	.39
Theft	1.00 (1.82)	0–6 (69.7%)	1.37 (2.19)	0–6 (63%)	0.68 (1.35)	0–4 (75.4%)	15.34 (1)*	.38

<sup>a</sup>Minus sign indicates that women's values are higher than men's.

\* $P < .001$ .

corresponding means). This sort of distribution is typically found in studies of IPV using the Conflict Tactics Scale and similar measures (Straus, 1979; Straus et al., 1996). The preferred method for such datasets, which are truncated at zero, highly skewed in the positive direction, and overdispersed (standard deviations are higher than the corresponding means), is negative binomial regression (Gardner, Mulvey, & Shaw, 1995; Hilbe, 2007<sup>94</sup>; Hutchinson & Holtman, 2005). This has been used in recent studies of IPV (e.g., Archer, Fernández-Fuertes, & Thanzami, 2010; Finkel, DeWall, Slotter, Oaten, & Foshee, 2009), and was used in the present case to test for differences between the factor analysis and the confirmatory factor analysis subsamples on each of the five NVOBS subscales. The Goodness of Fit statistics were satisfactory as the Deviance value should be near 1 (general violence: Value/df = 1.11; drugs: Value/df = 0.79; IPV: Value/df = 0.84; criminal damage: Value/df = 0.61; theft: Value/df = 0.69). There were no significant differences between the factor analysis and confirmatory factor analysis subsamples on each of the five NVOBS subscales: general violence (Wald  $\chi^2$  (1) = 0.97,  $P = .33$ ), drug offenses (Wald  $\chi^2$  (1) = 0.07,  $P = .79$ ), IPV (Wald  $\chi^2$  (1) = 0.14,  $P = .71$ ), criminal damage (Wald  $\chi^2$  (1) = .75,  $P = .39$ ), and theft offenses (Wald  $\chi^2$  (1) = 0.13,  $P = .72$ ). Therefore, the data from the two subsamples were combined, and means, standard deviations, and frequencies of scores were calculated for each subscale overall, and for men and women separately.

Negative Binomial Regressions (NBR) were used to test for sex differences on the five NVOBS subscales (see Table 2 for the NBR results). The Goodness of Fit statistics were again satisfactory as the Deviance values were near 1 (general violence: Value/df = 1.11; drugs: Value/df = 0.78; IPV: Value/df = 0.85; criminal damage: Value/df = 0.62; theft: Value/df = 0.69). Men perpetrated higher levels of general violence (Wald  $\chi^2$  (1) = 21.89,  $P < .001$ ), drug offenses (Wald  $\chi^2$  (1) = 10.97,  $P < .001$ ), criminal damage (Wald  $\chi^2$  (1) = 16.66,  $P < .001$ ), and theft offenses (Wald  $\chi^2$  (1) = 15.34,  $P < .001$ ) than women, but women perpetrated significantly more IPV (Wald  $\chi^2$  (1) = 51.32,  $P < .001$ ) than men. According to Cohen's (1988) criteria, effect sizes (shown in Table 2) were small for drug offenses, theft and criminal damage, and medium for IPV and general violence.

### Intercorrelations Between the Five Offending Behaviors

Table 3 shows the Pearson correlations between the five identified offense types separately for men and women to demonstrate the interrelatedness of offending for men and women. The results revealed small to moderate significant correlations between all offenses for women, and small to moderate significant correlations between most offenses for men. For men IPV was not correlated with drug offenses or criminal damage. Overall the correlational results suggest that men's and women's violent and nonviolent offending is interrelated,

**TABLE 3. Pearson Correlations for All Five Categories of Offending Behavior for Men and Women**

	Men					Women				
	GV	IPV	Drugs	CD	Theft	GV	IPV	Drugs	CD	Theft
GV	—	.20*	.18*	.35*	.33*	—	.28*	.20*	.31*	.26*
IPV		—	.03	.01	.20*		—	.23*	.21*	.23*
Drugs			—	.38*	.40*			—	.35*	.39*
CD				—	.47*				—	.43*

\* $P < .001$ .

and supports the theory that offenders are “cafeteria” criminals rather than specialists and are likely to be involved in a variety of criminal behavior where there is opportunity (Gottfredson & Hirschi, 1990). There was no evidence of multicollinearity as there were no correlations above .70.

## DISCUSSION

The aim of this study was to develop a self-report measure of violent and non-violent offending behavior which could be used by researchers to investigate the range of self-reported offending behavior in men and women in non-forensic populations. Five factors measuring violent and non-violent offending behavior in men and women were identified. These were: general violence, IPV, drug-related behavior, criminal damage, and theft. These categories are similar to the Home Office crime categories, which cover violent crime, acquisitive crime, vandalism/criminal damage, and drug offenses (Home Office, 2010). The NVOBS was shown to be psychometrically sound, with the resulting subscales having moderate to good internal consistency. Therefore, the NVOBS should be a useful instrument for measuring offending behavior in non-selected samples such as the ones used in the present study.

The new questionnaire distinguishes the components of offending, and allows for comparisons to be made between male and female offending. Examining sex differences in the NVOBS factors has provided support for previous research. We found that men self-reported more general violence than women: this was an expected finding, as a large body of research shows that, outside of intimate relationships, men are more violent than women, at every age and for various measures (Archer, 2004, 2009; Eme, 2007, 2009, 2010; Moffitt et al., 2001). The finding that men are more generally violent than women fits with the sexual selection theory where intrasexual competition is motivated by status and resource acquisition, and so sex differences should be most evident during young adulthood to correlate with the peak of reproductive competition (Daly & Wilson, 1988; Wilson & Daly, 1985). The current sample comprised predominantly young adults as the mean age of the current sample was 22 years. Eme (2010) suggested that the sex difference in violent behavior occurs because men are more vulnerable than women to a “host of neuro-developmental risk factors that in interaction with family and environmental adversity exponentially increase the probability of violent behavior” (p. 486).

We also found that women were more violent than men within intimate relationships, which also supports a large body of evidence. Research using unselected samples (such as student samples) shows that women can be as

violent as men within intimate relationships, if not more so (Archer, 2000, 2002, 2006, 2012; Graham-Kevan & Archer, 2003; Thornton, Graham-Kevan, & Archer, 2010). This finding has been found for both “minor” violence (e.g., pushing, slapping, hitting) as well as “severe” types of violence (Ehrensaft et al., 2004; Lussier et al., 2009; Straus, 2008), except for the items “beat up” and “choke” where the majority of the perpetrators were men (Archer, 2002), and women were the perpetrator in only about a third of cases. Research has shown that both men and women underreport their perpetration of IPV compared to reports about their partners, but this bias is more pronounced for men (Archer, 1999), leading to sex differences being slightly more in the female direction for perpetrators’ reports than for victims’ reports (Archer, 2000).

Alternatively, the current findings may be related to male students having more to lose in terms of reputation by physically aggressing against their female partners: in a student sample, people live within close proximity of each other, so that any IPV is likely to be detected. Male IPV is not socially sanctioned in such groups, this makes it more likely female victims would seek help and others would intervene on their behalf (Felson, 2002). Therefore, male students may have more to lose in a student sample than males in a community sample, and so they may inhibit their aggression towards their female partners, as the costs of not doing so are particularly high. Women’s IPV is not viewed as negatively as men’s and evokes less disapproval (Gerber, 1991), and therefore may attract less third party involvement. Men’s inhibition and the costs of IPV perpetration being lower for women than men may instead facilitate women’s violence towards her partner (George, 1994), which would result in less male perpetrators and more female perpetrators in a sample such as this.

We found that men perpetrated more non-violent offenses (drugs, criminal damage, and theft) than women, which supports existing research findings, such as those of Moffitt et al. (2001) and Steffensmeier and Allan (1996), who reported that men are generally more antisocial than women. The effect sizes were smallest for drug-related offenses, theft and criminal damage, and largest for IPV, and general violence, which is consistent with previous research (e.g., Moffitt et al., 2001; Smith & Visher, 1980<sup>Q5</sup>). Recent research by Vaughn, Fu, et al. (2011) suggests that females are significantly more likely than males to abstain from engaging in the use of substances and from antisocial behavior, which is consistent with the current finding that men engage in significantly more non-violent and generally violent offenses than women. The sexual selection theory may also account for why men may be involved in more nonviolent crimes than women. Men may steal or





1 damage resources in order to outcompete rivals and  
 2 increase the likelihood of their own access to females  
 3 (Kanazawa & Still, 2000; Walsh, 2000).

4 The correlations revealed the interrelatedness of  
 5 offending for men and women and showed that each  
 6 offense, whether violent or nonviolent, was related to the  
 7 perpetration of other offenses. All the results are  
 8 consistent with previous research and theories which  
 9 say that offenders are likely to be versatile, and unlikely  
 10 to specialize in one particular type of crime (DeLisi &  
 11 Piquero, 2011; Farrington et al., 2006; Gottfredson &  
 12 Hirschi, 1990), particularly those classed as “the severe  
 13 5%” of offenders who are versatile and are found to  
 14 engage in high levels of the majority of antisocial and  
 15 violent behavior (Vaughn, DeLisi, et al., 2011, p. 79). The  
 16 results are also consistent with the conclusions of  
 17 [Payne<sup>Q6</sup>](#), Higgins, and Blackwell (2010, p. 1015) that  
 18 “partner abusers should be viewed and treated as general  
 19 types of criminals rather than specific types of offenders”  
 20 because those who are violent within relationships are  
 21 also more likely to be violent towards others in other  
 22 settings. Altogether, the current findings demonstrate the  
 23 close association between violent and nonviolent  
 24 offending in men and women, and show that violent  
 25 and nonviolent offending tend not to occur in isolation  
 26 and instead form an interrelated set of complex  
 27 behaviors. The interrelatedness between the five types  
 28 of crime for men and women builds the case for  
 29 measuring them together to assess their comorbidity,  
 30 which is essential for extending our knowledge regarding  
 31 the onset, development, and underlying mechanisms  
 32 related to the different aspects of offending behavior in  
 33 men and women.

34 Howard and Dixon (2011) developed a classification of  
 35 violent offenses to be used to predict violent reoffending  
 36 as part of the Offender Assessment System (OASys). To  
 37 create this violence predictor, they examined a number of  
 38 the main violence risk assessment instruments and found  
 39 that there were 22 separate approaches for classifying  
 40 criminal acts as either violent or non-violent. None of  
 41 these classifications included drug offences or theft,  
 42 which were assessed in the current study. Howard and  
 43 Dixon (2011) concluded that “this lack of consensus on  
 44 the classification of violent criminal behavior is an  
 45 important issue for developers of new violence risk  
 46 measures.” Therefore, their research has also identified a  
 47 need for a comprehensive measure that classifies violent  
 48 and non-violent offenses. The results from Howard and  
 49 Dixon’s study have confirmed that violent and non-  
 50 violent offenses overlap, as a history of criminal damage  
 51 was found to predict future violent offending.

52 Studies such as the present one are limited in a number  
 53 of ways. First, factor analysis itself has limitations. Factor  
 54 analysis is a highly subjective procedure at a number of

stages. The judgments made throughout the analysis  
 including deciding which analytic method to use, which  
 rotation method to use, and how many factors or items to  
 retain or omit at each stage. However, we countered these  
 limitations by confirming the same results using an  
 alternative rotation method which indicated a robust  
 solution. We also used parallel analysis to identify the  
 number of factors to retain. This has been shown to be a  
 more accurate method than using either Kaiser’s  
 Criterion or Cattell’s Scree plot alone (Hayton  
 et al., 2004). Furthermore, there can be any number of  
 solutions and the interpretation of the solution is left to  
 the researcher. There are also no external criteria against  
 which to assess the validity of the solution. However, our  
 use of CFA to confirm the NVOBS factor structure  
 addresses this limitation. Acknowledging the limitations,  
 both factor analysis and CFA have been widely used in  
 scale development and are deemed to be very useful  
 evaluative methods.

A further potential limitation is that self-reports were  
 used. Self-reports can be affected by socially desirable  
 responding, and participants may deliberately distort  
 their responses by underreporting violent and antisocial  
 acts in order to minimize their involvement. This has  
 been found to be the case in the area of partner violence,  
 where both men and women underreport their perpetration  
 of IPV (Archer, 1999).

All participants in the current study were university  
 students. Therefore, a non-student sample could also be  
 used to establish norms and generalizability of the factor  
 structure. Therefore, researchers using the NVOBS  
 should report the internal consistency of the factors  
 from their research samples. However, the university  
 sample used in the current study has a reasonably wide  
 demographic range and there is a great deal of research in  
 this area that has used student samples (e.g., Fiebert &  
 Gonzalez, 1997; Foo & Margolin, 1995; Nabors, 2010;  
 Riggs & O’Leary, 1996; Straus, 2008; Straus &  
 Ramirez, 2004; White & Koss, 1991), and therefore  
 this scale will be of use in similar future research.

Furthermore, future research could assess additional  
 psychometric properties of the measure, for example,  
 test–retest reliability. Anonymity regarding participant  
 responses precluded test–retest data being obtained  
 during the current research, therefore, the current  
 research is limited in that it is not clear how stable  
 responses to the various NVOBS subscales are over time.  
 Also, the measure should be used in alternative  
 populations, such as prison and community samples, to  
 examine whether the norms identified in the student  
 sample are generalizable to other samples.

It was beyond the scope of the current study to include  
 association with other scales, but further studies will  
 include measures of validity (e.g., convergent,

discriminant) that are standard in validation papers, to evaluate the generalizability of the scale. For example, it is important to assess how responses to the five subscales relate to responses on widely used measures of trait aggression (e.g., Buss–Perry Aggression Questionnaire, Attitudes toward Violence Against Women) and other measures of IPV.

In conclusion, the questionnaire developed in this study is an improvement and extension of pre-existing measures because it is a comprehensive one that contains comparable questions for all three offense types (general violence, IPV, and non-violent offending), and uses the same response format throughout. The NVOBS appears to be a useful self-report measure of violent and non-violent offending with good psychometric properties.

### Appendix 1: Instructions to participants

#### IPV

Sometimes conflict gets out of hand and physical fights occur. Couples have many different ways of trying to settle their differences. This is a list of things that might happen when you have differences. Please use the following scale to answer the questions below. Please read each statement carefully, and then circle the number that corresponds to how many times you did each of these in the last year, and how many times your partner did them in the last year. If your relationship did not last for the whole of the past year, please indicate how many times you and your partner did each of these during your whole relationship.

How often did this happen in the past year?

0 = This has never happened, 1 = Once in the past year, 2 = Twice in the past year, 3 = 3–5 times in the past year, 4 = 6–10 times in the past year, 5 = 11–20 times in the past year, 6 = More than 20 times in the past year.

#### General violence

Sometimes conflict gets out of hand and physical fights occur. Please answer the following questions in relation to **your** behavior. Please **do not** include fights you have had with a romantic partner (such as a boyfriend/girlfriend **as you have already been asked about this in [Introduction](#)**<sup>Q7</sup> Section), only include fights with someone other than your partner, for example, friend, family member, stranger, etc.

Please use the following scale to answer the questions below. Please read each statement carefully, and then circle the number that corresponds to your reply.

How often did this happen in the past year?

0 = This has never happened, 1 = Once in the past year, 2 = Twice in the past year, 3 = 3–5 times in the past year, 4 = 6–10 times in the past year, 5 = 11–20 times in the past year, 6 = More than 20 times in the past year.

#### Non-violent offending

Please answer the following questions in relation to **your** behavior.

Please use the following scale to answer the questions below. Please read each statement carefully, and then circle the number that corresponds to your reply.

How often did this happen in the past year?

0 = This has never happened, 1 = Once in the past year, 2 = Twice in the past year, 3 = 3–5 times in the past year, 4 = 6–10 times in the past year, 5 = 11–20 times in the past year, 6 = More than 20 times in the past year.

#### REFERENCES

- Archer, J. (1999). Assessment of the reliability of the Conflict Tactics Scales: A meta-analytic review. *Journal of Interpersonal Violence, 14*, 1263–1289.
- Archer, J. (2000). Sex differences in aggression between heterosexual partners: A meta-analytic review. *Psychological Bulletin, 126*, 651–680.
- Archer, J. (2002). Sex differences in physically aggressive acts between heterosexual partners: A meta-analytic review. *Aggression and Violent Behavior: A Review Journal, 7*, 313–351.
- Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology, 8*, 291–322.
- Archer, J. (2006). Cross-cultural differences in physical aggression between partners: A social-role analysis. *Personality and Social Psychology Review, 10*, 133–153.
- Archer, J. (2009). Does sexual selection explain human sex differences in aggression? *Behavioral and Brain Sciences, 32*, 249–266.
- Archer, J. (2012). Can evolutionary principles explain patterns of family violence<sup>Q8</sup>? *Psychological Bulletin*. Advanced online publication.
- Archer, J., Fernández-Fuertes, A. A., & Thanzami, V. L. (2010). Does cost-benefit analysis or self-control predict involvement in two forms of aggression? *Aggressive Behavior, 36*, 292–304.
- Babcock, J. C., Miller, S., & Siard, C. (2003). Toward a typology of abusive women: Differences between partner-only and generally violent women in the use of violence. *Psychology of Women Quarterly, 13*, 46–59.
- Bendixen, M., & Olweus, D. (1999). Measurement of antisocial behavior in early adolescence and adolescence: Psychometric properties and substantive findings. *Criminal Behaviour and Mental Health, 9*, 323–354.
- Borjesson, W. I., Aarons, G. A., & Dunn, M. E. (2003). Development and confirmatory factor analysis of the abuse within intimate relationships scale. *Journal of Interpersonal Violence, 18*, 295–309.
- Busch, A. L., & Rosenberg, M. S. (2004). Comparing women and men arrested for domestic violence: A preliminary report. *Journal of Family Violence, 19*, 49–57.
- Buzawa, E., Hotaling, G. T., Klein, A., & Byrne, J. (1999). *Response to domestic violence in a proactive court setting*. Lowell: University of Massachusetts.



- Cadsky, O., & Crawford, M. (1988). Establishing batterer typologies in a clinical sample of men who assault their female partners. *Canadian Journal of Community Mental Health, 7*, 119–127.
- Capaldi, D. M., & Crosby, L. (1997). ~~Observed<sup>Q9</sup> and reported psychological and physical aggression in young, at-risk couples.~~ *Social Development, 6*, 184–206.
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research, 1*, 245–276.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Conradi, L. M., Geffner, R., Hamberger, L. K., & Lawson, G. (2009). An exploratory study of women as dominant aggressors of physical violence in their intimate relationships. *Journal of Aggression, Maltreatment & Trauma, 7*, 1–6.
- Dahlberg, L. L., Toal, S. B., & Behrens, C. B. (1998). *Measuring violence-related attitudes, beliefs and behaviors amongst youths: A compendium of assessment tools*. Atlanta, GA: Division of Violence Prevention, National Center on Injury Prevention and Control, Centers for Disease Control and Prevention.
- Daly, M., & Wilson, M. (1988). *Homicide*. New York: Aldine De Gruyter.
- DeLisi, M., & Piquero, A. R. (2011). New frontiers in criminal careers research, 2000–2011: A state-of-the-art review. *Journal of Criminal Justice, 39*, 289–301.
- DeLucia, B., Owens, C. E., Will, J. A., & McCoin, S. (1999). *Hubbard House, Inc. domestic offender obtaining reeducation (door) program outcome assessment, final report*. Jacksonville: Northeast Florida Centre for Community Initiatives, University of North Florida.
- Dobash, R. E., & Dobash, R. P. (1980). *Violence against wives: A case against the patriarchy*. London: Open Books.
- Dobash, R. E., & Dobash, R. P. (1992). *Women, violence and social change*. London: Routledge.
- Dobash, R. E., & Dobash, R. P. (1998). *Rethinking violence against women*. Thousand Oaks, CA: Sage.
- Dobash, R. P., & Dobash, R. E. (2004). Women's violence to men in intimate relationships: Working on a puzzle. *British Journal of Criminology, 44*, 324–349.
- Dobash, R. P., Dobash, R. E., Cavanagh, K., & Lewis, R. (1998). Separate and intersecting realities: A comparison of men's and women's accounts of violence against women. *Violence Against Women, 4*, 382–414.
- Dobash, R. P., Dobash, R. E., Wilson, M., & Daly, M. (1992). The myth of sexual symmetry in marital violence. *Social Problems, 39*, 71–91.
- Ehrensaft, M. K., Moffitt, T. E., & Caspi, A. (2004). Clinically abusive relationships in an unselected birth cohort: Men's and women's participation and developmental antecedents. *Journal of Abnormal Psychology, 113*, 258–271.
- Eme, R. F. (2007). Sex differences in child-onset, life-course-persistent conduct disorder: A review of biological influences. *Clinical Psychology Review, 27*, 607–627.
- Eme, R. F. (2009). Male life-course persistent antisocial behavior: A review of neurodevelopmental factors. *Aggression and Violent Behavior, 14*, 348–358.
- Eme, R. F. (2010). Male life-course-persistent antisocial behavior. *Archives of Pediatrics and Adolescent Medicine, 164*, 486–487.
- Fagan, J. A., Stewart, D. K., & Hansen, K. V. (1983). Violent men or violent husbands? Background factors and situational correlates. In D. Finkelhor, R. J. Gelles, G. T. Hotaling, & M. A. Straus (Eds.), *The dark side of families: Current family violence research*. Beverly Hills, CA: Sage.
- Farrington, D. P., Coid, J. W., Harnett, L., Jolliffe, D., Soteriou, N., Turner, R., & West, D. J. (2006). *Criminal careers and life success: New findings from the Cambridge study in delinquent behaviour*. Home Office Research study No. 281. London: Home Office.
- Felson, R. B. (2002). *Violence and gender reexamined*. Washington, DC: American Psychological Association.
- Fiebert, M. S., & Gonzalez, D. M. (1997). College women who initiate assaults on their male partners and the reasons offered for such behavior. *Psychological Reports, 80*, 583–590.
- Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). UK: Sage.
- Finkel, E., DeWall, C. N., Slotter, E. B., Oaten, M., & Foshee, V. A. (2009). Self-regulatory failure and intimate partner violence perpetration. *Journal of Personality and Social Psychology, 97*, 483–499.
- Foo, L., & Margolin, G. (1995). A multivariate investigation of dating aggression. *Journal of Family Violence, 10*, 351–377.
- Gardner, W., Mulvey, E. P., & Shaw, E. C. (1995). Regression analysis of counts and rates: Poisson, overdispersed, and negative binomial models. *Psychological Bulletin, 118*, 392–404.
- Gelles, R. J., & Straus, M. A. (1979). Determinants of violence in the family: Towards a theoretical integration. In W. R. Burr, R. Hill, F. I. Nye, & I. L. Reiss (Eds.), *Contemporary theories about the family* (pp. 549–581). New York: Free Press.
- George, M. J. (1994). Riding the donkey backwards: Men as the unacceptable victims of marital violence. *Journal of Men's Studies, 3*, 137–159.
- Gerber, L. G. (1991). Gender stereotypes and power: Perception and roles in violent marriages. *Sex Roles, 24*, 439–458.
- Giles-Sims, J. (1983). *Wife battering: A systems theory approach*. New York: Guildford.
- Graham-Kevan, N., & Archer, J. (2003). Physical aggression and control in heterosexual relationships: The effect of sampling. *Violence and Victims, 18*, 181–198.
- Graham-Kevan, N., & Archer, J. (2009). Control tactics and partner violence in heterosexual relationships. *Evolution & Human Behavior, 30*, 445–452.
- Gondolf, E. W. (1988). Who are those guys? Towards a behavioral typology of batterers. *Violence and Victims, 3*, 187–203.
- Gottfredson, M. R., & Hirschi, T. (1990). *A general theory of Crime*. USA: Stanford University Press.
- Gottfredson, M. R., & Hirschi, T. (2007). *A general theory of Crime* (3rd ed.). USA: Stanford University Press.
- Hay, D. F. (2005). The beginnings of aggression in infancy. In R. E. Tremblay, W. W. Hartup, & J. Archer (Eds.), *Developmental origins of aggression* (pp. 107–132). New York: The Guildford Press.
- Hayton, J. C., Allen, D. G., & Scarpello, V. (2004). Factor retention decisions in exploratory factor analysis: A tutorial on parallel analysis. *Organizational Research Methods, 7*, 191–205.
- Henning, K., & Feder, L. (2004). A comparison of men and women arrested for domestic violence: Who presents the greater threat? *Journal of Family Violence, 19*, 69–80.
- Henning, K., Jones, A., & Holdford, R. (2003). Treatment needs of women arrested for domestic violence: A comparison with male offenders. *Journal of Interpersonal Violence, 18*, 839–856.
- Higher Education Statistics Agency (HESA). <http://www.hesa.ac.uk/> [accessed on April 28, 2011].
- Holt, J. (2004). Item parceling in structural equation models for optimum solutions. Paper presented at the 2004 Annual Meeting of the Mid-Western Educational Research Association, Columbus, OH.
- Holtzworth-Munroe, A., Meehan, C., Herron, K., Rehman, U., & Stuart, G. L. (2000). Testing the Holtzworth-Munroe and Stuart (1994) Batterer typology. *Journal of Consulting and Clinical Psychology, 68*, 1000–1019.
- Home Office. (2010). *User guide to home office crime statistics<sup>Q10</sup>*. Home Office
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30*, 179–185.
- Hotaling, G. T., Straus, M. A., & Lincoln, A. J. (1990). Intrafamily violence and crime and violence outside the family. In M. A. Straus & R. J.



- Gelles (Eds.), *Physical violence in American families: Risk factors and adaptations to violence in 8, 145 families* (pp. 431–470). New Brunswick: Transaction.
- Howard, P., & Dixon, L. (2011). Developing an empirical classification of violent offences for use in the prediction of recidivism in England and Wales. *Journal of Aggression, Conflict and Peace Research*, 3, 141–154.
- Huizinga, D., Esbensen, F., & Weiher, A. W. (1991). Are there multiple paths to delinquency? *The Journal of Criminal Law & Criminology*, 82, 83–118.
- Hutchinson, M. K., & Holtman, M. C. (2005). Analysis of count data using poisson regression. *Research in Nursing and Health*, 28, 408–418.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 31–36.
- Kanazawa, S., & Still, M. C. (2000). Why men commit crimes (and why they desist). *Sociological Theory*, 18, 434–447.
- Klein, P. (1994). *An easy guide to factor analysis*. London: Routledge.
- ~~Krueger, R. F., Moffitt, T. E., Caspi, A., Bleske, A., & Silva, P. A. (1998). Assortative mating for antisocial behavior: Developmental and methodological implications. *Behavior Genetics*, 28, 173–186.~~
- Lussier, P., Farrington, D. P., & Moffitt, T. E. (2009). Is the antisocial child father of the abusive man? A 40-year prospective longitudinal study on the developmental antecedents of intimate partner violence. *Criminology*, 47, 741–780.
- Mak, A. S. (1993). A self-report delinquency scale for Australian adolescents. *Australian Journal of Psychology*, 45, 75–79.
- Moffitt, T. E., Caspi, A., Krueger, R. F., Magdol, L., Margolin, G., Silva, P. A., & Sydney, R. (1997). Do partners agree about abuse in their relationship? A psychometric evaluation of interpartner agreement. *Psychological Assessment*, 9, 47–56.
- Moffitt, T. E., Caspi, A., Rutter, M., & Silva, P. A. (2001). *Sex differences in antisocial behaviour: Conduct disorder, delinquency, and violence in the Dunedin longitudinal study*. UK: Cambridge University Press.
- Moffitt, T. E., Krueger, R. F., Caspi, A., & Fagan, J. (2000). Partner abuse and general crime: How are they the same, how are they different? *Criminology*, 38, 199–232.
- Moffitt, T. E., & Silva, P. A. (1988). Self-reported delinquency: Results from an instrument for New Zealand. *Australia & New Zealand Journal of Criminology*, 21, 227–240.
- Nabors, E. (2010). Drug use and intimate partner violence among college students: An in-depth exploration. *Journal of Interpersonal Violence*, 25, 1043–1063.
- Pedhazur, E., & Schmelkin, L. (1991). *Measurement, design and analysis: An integrated approach*. Hillsdale, NJ: Erlbaum.
- ~~Pratt, T. C., & Cullen, F. T. (2000). The empirical status of Gottfredson and Hirschi's general theory of crime: A meta-analysis. *Criminology*, 38, 931–964.~~
- Richardson, D. R., & Green, L. R. (1999). Social sanction and threat explanations of gender effects on direct and indirect aggression. *Aggressive Behavior*, 25, 425–434.
- Richardson, D. R., & Green, L. R. (2003). Defining direct and indirect aggression: The Richardson Conflict Response Questionnaire. *International Review of Social Psychology*, 16, 11–30.
- Riggs, D. S., & O'Leary, K. D. (1996). Aggression between heterosexual dating partners: An examination of a causal model of courtship aggression. *Journal of Interpersonal Violence*, 11, 519–540.
- Shields, N. M., McCall, G. J., & Hanneke, C. R. (1988). Patterns of family and nonfamily violence: Violent husbands and violent men. *Violence and Victims*, 3, 83–97.
- Steffensmeier, D., & Allan, E. (1996). Gender and crime: Toward a gendered theory of female offending. *Annual Review of Sociology*, 22, 459–487.
- Stevens, J. P. (1992). *Applied multivariate statistics for the social sciences* (2nd ed.). USA: Earlbaum.
- Straus, M. A. (1979). Measuring intrafamily conflict and violence: The conflict tactics (CT) scales. *Journal of Marriage and the Family*, 41, 75–88.
- ~~Straus, M. A. (1990). Measuring intrafamily conflict and violence: The Conflict Tactics (CT) Scales. In M. A. Straus & R. J. Gelles (Eds.), *Physical violence in American families: Risk factors and adaptations to violence in 8,145 families* (pp. 29–47). New Brunswick, NJ: Transaction.~~
- Straus, M. A. (2008). Dominance and symmetry in partner violence by male and female university students in 32 nations. *Children and Youth Services Review*, 30, 252–275.
- Straus, M. A., Hamby, S. L., Boney-McCoy, S., & Sugarman, D. B. (1996). The revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues*, 17, 283–316.
- Straus, M. A., & Ramirez, I. L. (2004). Criminal history and assault of dating partners: The role of type of prior crime, age of onset, and gender. *Violence and Victims*, 19, 413–434.
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). USA: Pearson Education.
- Thornton, A. J. V., Graham-Kevan, N., & Archer, J. (2010). Adaptive and maladaptive personality traits as predictors of violent and non-violent offending behavior in men and women. *Aggressive Behavior*, 36, 177–186.
- Tremblay, R. E., Nagin, D. S., Séguin, J. R., Zoccolillo, M., Zelazo, P. D., Boivin, M., ... Japel, C. (2004). Physical aggression during early childhood: Trajectories and predictors. *Pediatrics*, 114, 43–50.
- Vaughn, M. G., DeLisi, M., Gunter, T., Fu, Q., Beaver, K. M., Perron, B. E., & Howard, M. O. (2011). The severe 5%: A latent class analysis of the externalizing behavior spectrum in the United States. *Journal of Criminal Justice*, 39, 75–80.
- Vaughn, M. G., Fu, Q., Wernet, S. J., DeLisi, M., Beaver, K. M., Perron, B. E., & Howard, M. O. (2011). Characteristics of abstainers from substance use, antisocial behavior in the United States. *Journal of Criminal Justice*, 39, 212–217.
- Walsh, A. (2000). Evolutionary psychology and the origins of justice. *Justice Quarterly*, 17, 841–864.
- White, J. W., & Koss, M. P. (1991). Courtship violence: Incidence in a national sample of higher education students. *Violence and Victims*, 6, 247–256.
- Wilson, M. I., & Daly, M. (1985). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and Sociobiology*, 6, 59–73.
- Wilson, M. I., & Daly, M. (1992). The man who mistook his wife for a chattel. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind* (pp. 289–321). New York: Oxford University Press.
- Wilson, M. I., & Daly, M. (1996). Male sexual proprietariness against wives. *Current Directions in Psychological Science*, 5, 2–7.

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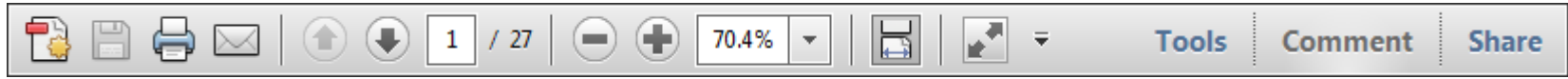
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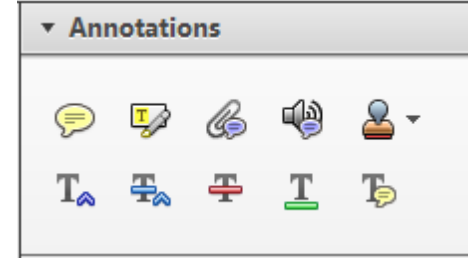
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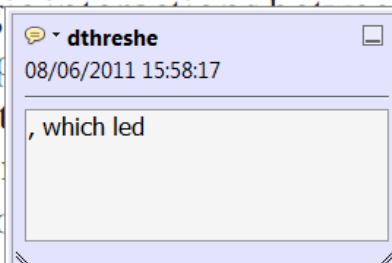


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standard framework for the analysis of microeconomics. Nevertheless, it also led to the emergence of strategic behavior in the number of competitors in the industry. This is that the structure of the industry, which led to the emergence of imperfect competition. The main components of the industry, which are exogenous to the industry, are important works on entry by Shirasaka (1987) and henceforth. We open the 'black b



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there is no room for extra profits and the number of competitors are zero and the number of competitors (net) values are not determined by the number of firms. Blanchard and Kiyotaki (1987), in their paper on perfect competition in general equilibrium, show that the structure of aggregate demand and supply in the classical framework assuming monopoly is not affected by an exogenous number of firms.

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- Click on the [Add note to text](#) icon in the Annotations section.
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dynamic responses of mark-ups consistent with the VAR evidence

sation of the industry with well-labeled demand curves. The number of competitors in the industry is consistent with the demand-



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and supply shocks. Most of the industry is consistent with the demand-



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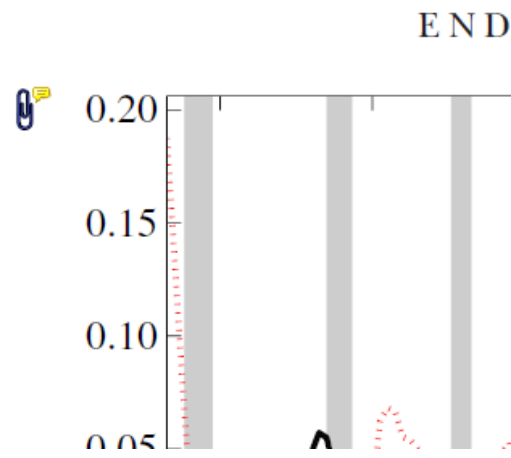
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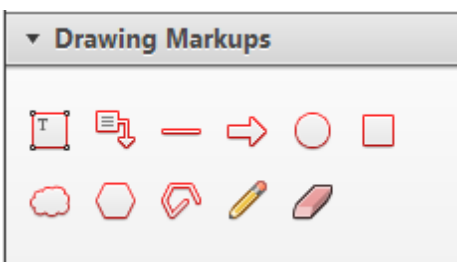


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of the business cycle, starting with the  
 on perfect competition, constant ret  
 production. In this environment goods  
 extra profits and the market for marke  
 he market for goods is determined by the model. The New-Key  
 otaki (1987), has introduced produc  
 general equilibrium models with nomin  
 and market-clearing. Most of this literat

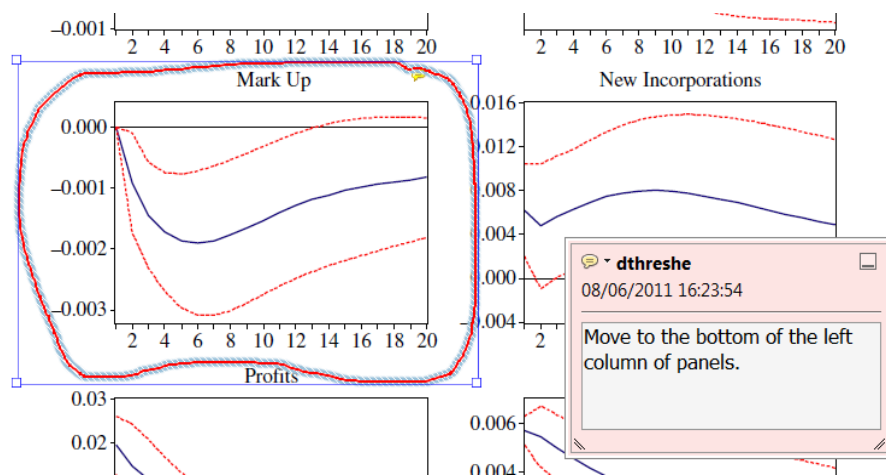


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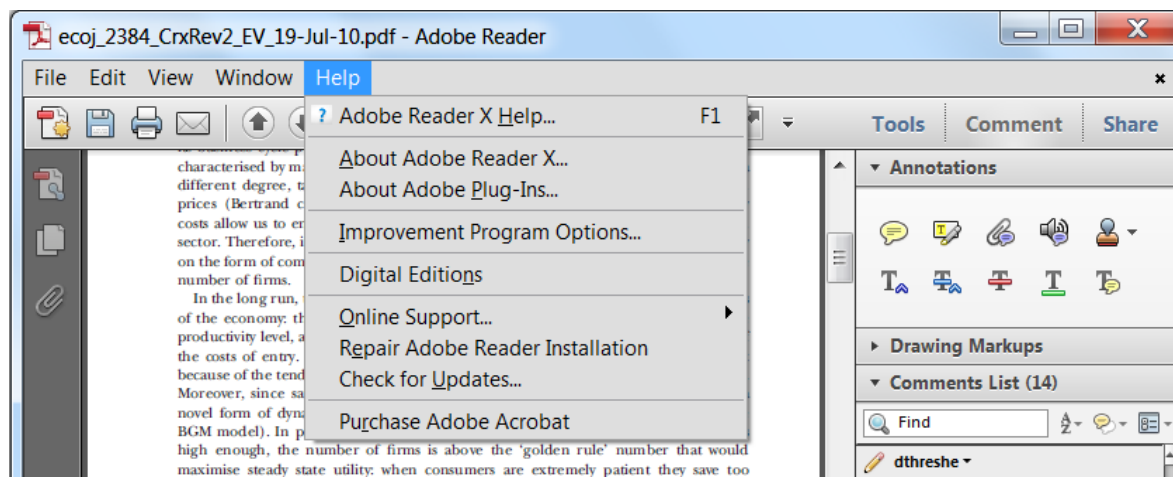
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