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A systematic review of cognitive functioning among young people who have experienced homelessness, foster care, or poverty

Charlotte E. Fry ^a, Kate Langley^{a,b} and Katherine H. Shelton^a

^aSchool of Psychology, Cardiff University, Cardiff, UK; ^bMRC Centre for Neuropsychiatric Genetics and Genomics, Cardiff University, Cardiff, UK

ABSTRACT

Young people who have experienced homelessness, foster care, or poverty are among the most disadvantaged in society. This review examines whether young people who have these experiences differ from their non-disadvantaged peers with respect to their cognitive skills and abilities, and whether cognitive profiles differ between these three groups. Three electronic databases were systematically searched for articles published between 1 January 1995 and 1 February 2015 on cognitive functioning among young people aged 15 to 24 years who have experienced homelessness, foster care, or poverty. Articles were screened using pre-determined inclusion criteria, then the data were extracted, and its quality assessed. A total of 31 studies were included. Compared to non-disadvantaged youth or published norms, cognitive performance was generally found to be impaired in young people who had experienced homelessness, foster care, or poverty. A common area of difficulty across all groups is working memory. General cognitive functioning, attention, and executive function deficits are shared by the homeless and poverty groups. Creativity emerges as a potential strength for homeless young people. The cognitive functioning of young people with experiences of impermanent housing and poverty has been relatively neglected and more research is needed to further establish cognitive profiles and replicate the findings reviewed here. As some aspects of cognitive functioning may show improvement with training, these could represent a target for intervention.

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Young people who have experienced homelessness, foster care, or poverty are among the most vulnerable in society due to experiences including unstable housing, disrupted schooling, scant resources, and inadequate social and psychological support (Bradley & Corwyn, 2002; Haber & Toro, 2004; Stein, 2005). They may also have multiple risk factors which could accumulate to increase the likelihood of unfavorable outcomes (Sameroff, Seifer, Baldwin, & Baldwin, 1993). Masten, Miliotis, Graham-Bermann, Ramirez, and Neemann (1993) proposed a continuum of risk in which those with

CONTACT Charlotte E. Fry  FryC1@cardiff.ac.uk  School of Psychology, Cardiff University, Tower Building, 70 Park Place, Cardiff, CF10 3AT, UK

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greater exposure to adversity and more risk factors present are less likely to adapt successfully compared to young people without such exposure. In general, homeless young people are considered to be at the extreme end of this continuum due to being exposed to multiple adverse experiences and stressors, in addition to the stress of homelessness itself (Buckner, 2008; Masten et al., 1993).

However, there is no consensus on the cognitive profiles of homeless young people and whether these are consistent with a continuum of risk. Cognitive functioning could be an important factor in increasing the risk for becoming homeless, as well as presenting barriers to exiting homelessness, for example by contributing to the breakdown of family relationships (Backer & Howard, 2007; Milburn et al., 2009). Poverty and homelessness tend to be intertwined, including a high prevalence of a history of poverty among homeless adults (Patterson, Moniruzzaman, & Somers, 2015). Similarly, studies of young people aging out of care found an increased likelihood of homelessness (Courtney & Dworsky, 2006; Dworsky, Napolitano, & Courtney, 2013; Fowler, Toro, & Miles, 2009), and studies of homeless adults have identified a high level of foster care in childhood (Patterson et al., 2015; Roos et al., 2014). Together, this suggests that members of each of these groups may be at different points on the same trajectory. In other words, poverty and foster care groups include a disproportionate number of people “at risk” for homelessness, theoretically placing the groups at different points along the same continuum of risk (Masten et al., 1993). This indicates that there are factors common to young people who have experienced homelessness, foster care, or poverty, including instability at home and school, reduced access to resources and opportunities, and a relative lack of social support (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001; Milburn et al., 2009). However, less is known about how these factors relate to cognitive development and consequently result in poorer outcomes.

To date, there has not been a review or synthesis of the literature on cognition in these groups of young people, making it difficult to establish any commonalities in cognitive profiles. Cognitive skills can be referred to as thinking skills that underlie academic competence and successful adaptation (Sternberg et al., 2000). It is possible that, in the context of disadvantage, cognitive skills and abilities may constitute a key set of “tools” that set apart those who adapt well and make effective use of the resources available to them and those who do not (Masten & Coatsworth, 1998). Domains of cognition include memory, attention, verbal ability, and higher-order thinking processes known as the executive functions. This review focuses on cognitive functioning in young people who have experienced homelessness, comparing them both to young people with similar adverse experiences (i.e., poverty and foster care) who are at risk for homelessness, and to young people who have not had these experiences.

The United Nations (UN) defines “youth” as the period of 15 to 24 years of age (United Nations, 2007), encompassing both late adolescence and emerging adulthood (18 to 25 years of age; Arnett, 2000). There is evidence that late adolescence and emerging adulthood form a sensitive period of development, with numerous changes occurring in the brain; the frontal lobes in particular are still developing (Blakemore, 2012). Thus, it is important to consider the cognitive profiles of particularly vulnerable groups of young people, including those who have experienced homelessness, foster care and poverty with a view to developing appropriate interventions and support.

Homelessness

It has been estimated that there are over 100 million children and youth living on the streets worldwide (Thomas de Benitez, 2007). This is likely to be an underestimate of the true figure, as homelessness often encompasses not only those who live on the street but also those living in unsuitable accommodation, such as motels or youth hostels (Toro, Dworsky, & Fowler, 2007), and those who live peripatetically with acquaintances and friends (Reeve & Batty, 2011). It is possible that aspects of cognitive functioning among young people who have experienced homelessness contribute to problems with securing and maintaining accommodation. This may be because of problems or deficits in the ability to make informed decisions, problem-solve and plan, along with the potential issue of limited social skills (Backer & Howard, 2007).

There remains a distinct paucity of research on the cognitive profiles of homeless youth during late adolescence and emerging adulthood, especially compared to homeless adults and children within homeless families (Parks, Stevens, & Spence, 2007). The only previous systematic review in this area, Parks et al. (2007), identified just two studies conducted with homeless adolescents that met very broad inclusion criteria: one, which was published outside the date range of this review, compares glue-sniffing street youth with street youth who do not sniff glue (Jansen, Richter, & Griesel, 1992), while the other uses self-ratings of ability rather than objective cognitive tests (Ryan, Kilmer, Cauce, Watanabe, & Hoyte, 2000).

Foster Care

In 2013, just over 400,000 children and youth were in foster care in the United States (US), with around 50,000 leaving care between the ages of 16 and 20 years (US Department for Health and Human Services, 2014). Some estimates indicate that 30 to 40% of young people in care experience four or more changes of placement, with up to 10% experiencing ten or more placements (Stein, 2005). Young people leaving care are at high risk of becoming homeless, which is likely to be exacerbated by cognitive impairment (Backer & Howard, 2007; Kerman, Wildfire, & Barth, 2002). Indeed, the prevalence of language delays and cognitive delays among children in foster care has been reported to be 57% and 33% respectively, compared to 4 to 10% in the general population (Leslie et al., 2005).

Reviews of young people in foster care have typically used academic tests or educational attainment as an index of cognitive development rather than objective cognitive tests (e.g., Stein, 2005). Young people who have experienced foster care are more likely to have experienced disrupted schooling, with potential implications for academic attainment (Pecora et al., 2006). Therefore, it is probably more instructive to focus on measures of cognitive functioning, including memory, attention, planning, and problem-solving.

Poverty

Just over 75 million children and youth live in poverty in the world's wealthiest countries (UNICEF Innocenti Research Centre, 2014). Young people living in poverty

are likely to lack not only financial resources but also material, social, and cultural resources (Bradley et al., 2001). The poorest children and adolescents in some of the wealthiest countries are at risk for reduced memory capacity, impaired cognitive development and lower educational achievement (UNICEF Innocenti Research Centre, 2010). Indeed, many studies have demonstrated cognitive deficits in low socioeconomic status (SES) children compared to high SES children (Brooks-Gunn & Duncan, 1997).

A systematic review of cognitive functioning for an adolescent age group living in poverty has not been published. Bradley and Corwyn's (2002) comprehensive review investigates the effect of SES on children's development and identifies a link between SES and both IQ and verbal ability. It remains to be established if this finding generalizes to adolescence and emerging adulthood.

Mental Health

It is well established that there are higher rates of mental illness in those who have experienced homelessness, foster care, or poverty than in the general population (Akister, Owens, & Goodyer, 2010; Hodgson, Shelton, van den Bree, & Los, 2013; Patel & Kleinman, 2003). For example, Hodgson, Shelton, and van den Bree (2014) found that among young people who have experienced homelessness, 88% screened for any current mental health disorder and 73% for comorbid mental health disorders, compared to 32% and 12%, respectively in the age-matched general population. Specifically, the prevalence of anxiety disorders was 49% vs. 4%, 42% screened for substance dependence vs. 11%, rates of post-traumatic stress disorder (PTSD) were 36% vs. 5%, prevalence of mood disorders was 19% vs. 2%, and psychosis was present in 7% vs. 0.2%. Poor mental health has a well-documented relationship with lower levels of cognitive functioning in both psychiatric and general populations (see e.g., Castaneda, Tuulio-Henriksson, Marttunen, Suvisaari, & Lönnqvist, 2008). Indeed, Baune, Fuhr, Air, and Hering (2014) reviewed the literature on neuropsychological functioning in adolescents and emerging adults with major depressive disorder (MDD) and found a broader range of cognitive deficits in those with MDD compared to the controls. A recent meta-analysis also found that adolescents with MDD display impaired performance on tasks of executive function compared to their healthy peers (Wagner, Müller, Helmreich, Huss, & Tadić, 2015). It is especially important to examine relationships between mental health and cognitive functioning in disadvantaged populations, such as young people who have experienced homelessness, foster care, or poverty. While cognitive skills and abilities have been found to be associated with adaptive behavior (Clark, Prior, & Kinsella, 2002), these groups are more likely to face challenging situations—as well as to have higher rates of mental illness—than their peers without these experiences, which may compromise adaptation and recovery from adversity.

Potential Implications

Although there are mixed findings for the effectiveness of cognitive skills training (Klingberg, 2010; Melby-Lervåg & Hulme, 2013; Morrison & Chein, 2011; Shipstead, Redick, & Engle, 2012), there is some evidence that it may be beneficial to low SES children (Jolles & Crone, 2012). There is also tentative evidence to suggest that

cognitive skills training in certain domains can lead to broader benefits, for example in academic performance (Holmes & Gathercole, 2014). These findings suggest that aspects of cognitive functioning may be a good target for intervention, which could in turn lead to broader long-term benefits for young people who have experienced homelessness, foster care, or poverty.

Given the lack of synthesized data in this area, the aim of this study is to review and synthesize across three literatures to address four key questions:

- (1) Do young people who have experienced homelessness, foster care, or poverty differ from young people without such experiences with respect to cognitive skills and abilities?
- (2) If they do differ, which are the areas of cognitive functioning that are impaired and/or enhanced?
- (3) Does cognitive functioning differ between the three groups?
- (4) Among the studies included in this review, is cognitive functioning associated with mental health disorders in young people who have experienced homelessness, foster care, or poverty?

Method

This systematic review was completed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Liberati et al., 2009) guidelines, a checklist for ensuring the transparent reporting of systematic reviews that is recognized worldwide. An electronic search of Web of Science (Thomson Reuters), MEDLINE and PsycINFO (via Ovid) was conducted. Articles published from 1 January 1995 to 1 February 2015 were searched using the search strategy detailed in the supplementary materials. A manual citation search was also conducted.

Papers were screened using inclusion and exclusion criteria decided in advance. Only journal articles were included; other types of publication were excluded. Although the UN's definition of youth as those between the ages of 15 to 24 years was initially used (United Nations, 2007), a number of studies using wide age bands meant that the age criteria had to be reconsidered. Because of the relative lack of research on youth in these areas, studies were not excluded if they overlapped the target age range of 15 to 24 years, and the mean age was 11 years or older, as this is often the recognized onset of adolescence (Spear, 2000).

Having removed duplicates, studies were screened by title and abstract. A total of 100 studies were subsequently subjected to full-text screening; articles that did not meet the inclusion criteria were excluded. All stages were checked independently by two researchers and any discrepancies were resolved by discussion. For some studies, more information was needed if they were to be included. In this instance, the corresponding authors of the papers were contacted. Two authors kindly provided the data requested (Flouri, Mavroveli, & Panourgia, 2013; Staiano, Abraham, & Calvert, 2012). A manual citation search of the 26 included studies yielded 5 additional studies which met inclusion criteria, making a total of 31 included studies.

The information extracted consists of study/participant characteristics, relevant descriptive and inferential statistics, putative risk(s) and outcome(s) of interest, how the authors interpreted their results, and any relations with mental health identified. Where studies had not used relevant comparison groups, comparisons with published norms were made where possible (see [Table 1](#)).

An adapted version of the Newcastle Ottawa Scale (NOS; Wells et al., 2000) was used to assess the quality of the methodology and reporting in the included studies. Each study was categorized by design as case-control, cohort, or norm-comparison, and assessed on items relating to three areas: selection (i.e., definition of homelessness, foster care, and/or poverty, representativeness, selection of comparison group), comparability (i.e., controlling for relevant factors), and outcome (i.e., method of assessment, follow-up/non-responders). One star was awarded where the criteria were met (e.g., where cognitive performance was assessed using validated objective cognitive tests). Two stars could be awarded for comparability (e.g., controlled for education and other factors). The maximum number of stars that could be awarded differed by design, as some criteria were not applicable. Ratings from two or more independent researchers were compared, averaging 95% agreement, with disagreements resolved by discussion to reach consensus. In their comprehensive review of quality assessment tools, Deeks et al. (2003) recommended only the NOS and 5 other tools for use in systematic reviews out of 194 tools identified, based on their coverage of core internal validity criteria.

The authors decided that it would be inappropriate to conduct meta-analyses on the data yielded by this review because the studies were too heterogeneous in terms of definitions of homelessness, foster care, and poverty, cognitive tests used, design, and type of sample (Egger, Smith, & Sterne, 2001).

Results

A total of 31 articles are included in the review; 22 used samples of young people who had experienced poverty, 6 used samples of young people who had experienced homelessness, and 3 used samples of young people who had experienced foster care. The majority of these studies were conducted in the US ($n = 18$), with the rest conducted in South America ($n = 4$), Canada ($n = 2$), Sweden ($n = 2$), Israel ($n = 2$), the United Kingdom (UK; $n = 1$), the Caribbean ($n = 1$), and the Seychelles ($n = 1$). Of the studies 14 are based on cross-sectional design, while another 10 use longitudinal methods. The remainder use a retrospective design ($n = 3$) or are randomized control trials ($n = 4$). All-male samples were used in 3 studies, 2 of which used military conscription data, and the third because of anticipated differences between male and female street children.

Cognitive Domains and Tests

The majority of studies investigate general cognitive functioning ($n = 18$), however there is also good representation of individual cognitive domains: executive function ($n = 10$), learning and memory ($n = 10$), attention ($n = 7$), and language ($n = 3$). Often, studies assessed more than one domain. Learning and memory are intrinsically linked, with different types of learning often falling under the umbrella of non-declarative memory

Table 1. Characteristics and Key Findings of Studies Included in the Systematic Review.

Study	Country	Age range (years)	Sample size and groups used	Cognitive domains	Cognitive tests	Key findings
Homelessness Borges-Murphy et al. (2012)	Brazil	11–16	16 youth in shelters; 11 age-matched controls	Selective attention; Memory	Non-verbal dichotic listening test; Memory for verbal and non-verbal stimuli	Homeless youth had significantly lower mean scores than age-matched controls.
Dahlman et al. (2013)	Bolivia	10–17	36 street-involved male youth; 31 housed low SES male youth	Executive function; General cognitive functioning; Creativity	WCST-64; Children's Color Trails Test; Leiter-R; Alternative Uses Task	Street youth performed at a similar level to low SES youth on tests of executive function and general cognitive functioning, yet significantly outperformed low SES youth on a test of creativity/divergent thinking.
Pluck et al. (2015)	Ecuador	10–17	37 former street youth	General cognitive functioning	WASI Block Design and Matrix Reasoning	Former street youth had very low mean raw scores ^a .
Rafferty et al. (2004)	US	11–17	45 formerly homeless youth; 86 low SES youth who were never homeless	General cognitive functioning	WISC-R Similarities	No significant difference between groups with both scoring about 1 SD below the normative mean ^a .
Rohde et al. (1999)	US	16–21	50 street youth	General cognitive functioning	WAIS-R	Street youth performed within the average range, with stronger performance IQ scores compared to verbal IQ scores ^a .
Saperstein et al. (2014)	US	18–22	55 homeless youth enrolled in a residential and employment program	Verbal memory; Working memory; Attention; Processing speed; Executive function	WMS-IV; CVLT-II; WAIS-III; D-KEFS, selected subtests	64% of homeless youth scored 1 SD below the normative mean in at least one cognitive domain, with particular impairments in memory and working memory. Full scale IQ in the low average range, approximately 1 SD below the normative mean ^a .
Foster care Berger et al. (2009)	US	7–17	342 young people who have experienced out-of-home placement; 2111 young people who have not experienced out-of-home placement	General cognitive functioning	Kaufman Brief Intelligence Test	No relationship found between out-of-home placement experience and cognitive functioning. Mean raw scores for both groups were just over half of the maximum score on both subtests ^b .

(Continued)

Table 1. (Continued).

Study	Country	Age range (years)	Sample size and groups used	Cognitive domains	Cognitive tests	Key findings
Kira et al. (2012)	US	11–17	12 youth who have experienced foster care (out of a larger sample who have experienced "attachment traumas")	General cognitive functioning; Working memory	WISC-IV	Foster care experience significantly negatively related to working memory. Full scale IQ for the whole sample (all "attachment traumas") just over 1 SD below the normative mean ^a .
Vinnerljung and Hjern (2011)	Sweden	18 (inferred)	1551 male youth who have experienced foster care; 464,848 male youth from the majority population	General cognitive functioning	Military conscription intelligence test	Youth who had experienced foster care performed just over 0.5 SDs below majority population youth.
Poverty						
Alaimo et al. (2001)	US	12–16	2063 youth from a representative national sample (NHANES-III)	General cognitive functioning	WISC-R Block Design and Digit Span	Poverty Index Ratio (higher = higher income) significantly positively associated with cognitive functioning.
Campbell et al. (2002)	US	21	23 young adults from low SES families who had not received any intervention	General cognitive functioning	WAIS-R	Both mean full-scale IQ and verbal IQ low average compared to norms, whereas performance IQ within the average range ^a .
Chappell and Overton (2002)	US	15–24	268 youth in 10th grade, 12th grade, or college; median split into low SES and high SES groups but <i>n</i> for each group not given	Reasoning	Overton's Selection Task, General solution score	High SES students scored significantly higher than low SES students.
Coles et al. (2002)	US	13–17	53 youth from low SES families who had not been prenatally exposed to alcohol	Sustained attention	Continuous Performance Test-type task	Non-exposed low SES youth scored over 1 SD below the mean of a normative sample ^c .
Evans and Schamberg (2009)	US	17–18	195 young adults, approximately half below the poverty line and half middle SES, exact <i>n</i> not given	Working memory	Simon game	Proportion of childhood spent in poverty significantly negatively related to working memory in young adults. Middle SES young adults had a higher average working memory span than low SES young adults.
Flouri et al. (2013)	UK	10–19	280 secondary school students eligible for free school meals; 1083 secondary school students not eligible for free school meals	General cognitive functioning	Raven's Standard Progressive Matrices Plus	Eligibility for free school meals significantly associated with lower cognitive functioning.

(Continued)

Table 1. (Continued).

Study	Country	Age range (years)	Sample size and groups used	Cognitive domains	Cognitive tests	Key findings
Goldberg et al. (2011)	Israel	16–17	811,487 youth from a national sample	General cognitive functioning	Modified Otis-type intelligence test; Verbal analogies; Non-verbal analogies	SES significantly positively related to cognitive functioning.
Hackman et al. (2014)	US	10–18	304 youth recruited from schools; SES assessed as a continuous measure	Working memory	Corsi Blocks; Spatial Working Memory; Object Two-back; WISC-IV Digit Span Backwards	Low parental education significantly associated with lower scores on working memory tasks.
Hemmingsson et al. (2007)	Sweden	18–20	44,995 males from a national sample, 54.9% low SES, exact <i>n</i> not given	General cognitive functioning	Military conscription cognitive test	As a general pattern, there were higher percentages (60–70%) of low SES males in the lower IQ bands (below average) than in the higher IQ bands (30–50%).
Howell et al. (2006)	US	13–17	53 youth from low SES families who had not been prenatally exposed to alcohol	General cognitive functioning	WISC-III	Non-exposed low SES youth had mean full-scale IQ scores in the borderline range, with verbal and performance IQ scores just falling into the low average range ^a .
Ivanovic et al. (2000)	Chile	17–19	16 non-undernourished low SES young adults	General cognitive functioning	WAIS (Spanish)	All IQ scores for non-undernourished low SES young adults within the average range ^a .
Johnson et al. (2010)	Canada	19–26	132 low SES young adults without speech/language impairment	Language; General cognitive functioning	Peabody Picture Vocabulary Test-III; WAIS-III, selected subtests	Higher family SES and maternal education in childhood were associated with higher scores on a language task in young adulthood. Childhood language scores significantly predicted occupational SES in young adulthood. Full-scale IQ for young adults without speech or language impairment was average compared to norms ^a .
Kobrosly et al. (2011)	Seychelles	17	463 youth from a national sample (SCDS)	Executive function; Learning; Attention; Memory; Working memory	CANTAB, selected subtests	SES significantly positively associated with performance on all tasks.

(Continued)



Table 1. (Continued).

Study	Country	Age range (years)	Sample size and groups used	Cognitive domains	Cognitive tests	Key findings
Kramer et al. (1995)	US	12–16	849 youth from a national sample (NHANES-III)	General cognitive functioning	WISC-R Digit Span and Block Design	Family income significantly positively related to performance. Maternal education below high school level significantly associated with lower cognitive functioning.
Lupien et al. (2001)	Canada	15–16	24 low SES high school students; 34 high SES high school students	Memory; Language; Selective attention	Declarative memory task; Verbal fluency task; Visual detection task	No significant differences between low SES and high SES students on memory or language tasks. Low SES students significantly outperformed high SES students on selective attention task. SES significantly positively related to cognitive functioning in both high school and college students.
Myerson et al. (1998)	US	14–21	2726 high school and college students from a national sample (NLSY)	General cognitive functioning	Armed Forces Qualification Test	Non-exposed high SES youth had significantly higher scores on the majority of subtests than non-exposed low SES youth. Scores on the Picture Arrangement subtest did not significantly differ between the two groups.
Ornoy et al. (2010)	Israel	12–16	27 low SES youth who had not been prenatally exposed to drugs; 51 high SES youth who had not been prenatally exposed to drugs	General cognitive functioning	WISC-III	Non-exposed high SES youth had significantly higher scores on the majority of subtests than non-exposed low SES youth. Scores on the Picture Arrangement subtest did not significantly differ between the two groups.
Robey et al. (2014)	US	14–16	46 youth from low SES families who had not been prenatally exposed to drugs	Prospective memory; Executive function; Working memory; Verbal memory; Attention; General cognitive functioning	Memory for Future Intentions Task; D-KEFS Color-Word Interference Test; CANTAB Spatial Working Memory; CVLT –Children's Edition; Conners' Continuous Performance Test II; WASI Matrix Reasoning and Vocabulary	Non-exposed low SES youth made approximately twice as many between-search errors on a working memory task ^d , scored between average and mildly atypical on a test of sustained attention ^e , and scored within 1 SD of the normative mean on tests of executive function ^f and verbal memory ^g . Full-scale IQ within the average range ^e .
Skoe et al. (2013)	US	14–15	33 high school students from low SES families; 33 high school students from high SES families	Working memory; General cognitive functioning	WASI; Woodcock–Johnson Test of Cognitive Abilities Numbers Reversed and Auditory Working Memory	Students with low maternal education scored significantly lower on working memory than students with high maternal education, however IQ for both groups did not significantly differ and fell within the average range ^e .

(Continued)

Table 1. (Continued).

Study	Country	Age range (years)	Sample size and groups used	Cognitive domains	Cognitive tests	Key findings
Staiano et al. (2012)	US	15–19	54 low SES school students, baseline scores used (before intervention)	Executive function	D-KEFS Design Fluency and Trail Making	As a total D-KEFS score was calculated by summing the raw scores on the two subtests, no comparisons could be made. High SES college students significantly outperformed low SES college students at pre-test.
Tine (2014)	US	17–21	21 low SES college students, 18 high SES college students, pretest scores for the control group used	Selective attention	d2 Test of Attention	
Walker et al. (2005)	Jamaica	17–18	64 non-stunted youth from low SES neighborhoods who had not received any intervention	Reasoning; Working memory; Language; General cognitive functioning	Raven's Standard Progressive Matrices Digit Span Backwards; Corsi Blocks; Peabody Picture Vocabulary Test; WAIS	Non-stunted low SES youth had extremely low scores (below the 5th percentile) on a test of cognitive functioning compared to normative data ^h . Working memory raw scores within 1 SD of the normative mean ⁱ .

Note. ^aFlanagan and Kaufman (2009); ^bBain and Jaspers (2010); ^cChen, Hsiao, Hsiao, and Hwu (1998); ^dDe Luca et al. (2003); ^eStrauss, Sherman, and Spreen (2006); ^fHomack, Lee, and Riccio (2005); ^gDonders (1999); ^hRaven (2000); ⁱWilde, Strauss, and Tulskey (2004). CANTAB = Cambridge Neuropsychological Test Automated Battery; CVLT = California Verbal Learning Test; D-KEFS = Delis-Kaplan Executive Function System; NHANES-III = National Health and Nutrition Examination Survey; NLSY = National Longitudinal Survey of Youth; SCDS = Seychelles Child Development Study; SES = socioeconomic status; WAIS = Wechsler Adult Intelligence Scale; WASI = Wechsler Abbreviated Scale of Intelligence; WCST-64 = Wisconsin Card Sort Test – 64 Card Version; WISC = Wechsler Intelligence Scale for Children; WMS = Wechsler Memory Scale.

(Squire, 2004). Tests used to assess these cognitive domains varied greatly: from those used for military conscription tests to memory paradigms. Full details of the tests used in each article can be found in [Table 1](#).

Definitions

Homelessness

Definitions of homelessness ranged from those literally living on the street to the formerly homeless. Four studies had samples of current or former street youth (Borges-Murphy, Pontes, Stivanin, Picoli, & Schochat, 2012; Dahlman, Bäckström, Bohlin, & Frans, 2013; Pluck, Banda-Cruz, Andrade-Guimaraes, Ricaurte-Diaz, & Borja-Alvarez, 2015; Rohde, Noell, & Ochs, 1999), with varying requirements for duration, but all samples were generally unsupervised by adults and had no stable place to stay. Only two used comparison groups: low-income housed youth recruited from similar programs (Dahlman et al., 2013), and age-matched adolescents (Borges-Murphy et al., 2012). Saperstein, Lee, Ronan, Seeman, and Medalia (2014) recruited young adults enrolled for at least one month in a residential and vocational support program for homeless young people. As this scheme was designed to facilitate transition to independent living and the majority of participants were in employment, these young people were in a relatively more stable position than those living on the street. In Rafferty, Shinn, and Weitzman's (2004) study, formerly homeless adolescents had spent between one night and 56 months in emergency shelters. The comparison group had been on welfare in the six months prior to recruitment and had not been in shelter in the past month.

Foster Care

The definitions provided by studies in the foster care category demonstrate considerable heterogeneity. Vinnerljung and Hjern (2011) identified participants through the National Child Welfare Register in Sweden. Data for those who had entered foster care before 7 years of age and had remained in care for at least 12 years prior to turning 18 were compared to both an adoption group and a majority population group. Participants in Kira, Somers, Lewandowski, and Chiodo's (2012) study were asked about foster care experiences as part of the Cumulative Trauma Scale. Foster care was classed as an attachment disruption and therefore a potentially traumatic event. Berger, Bruch, Johnson, James, and Rubin (2009) defined out-of-home care as having been removed from home between the initial and follow-up assessments (approximately 2.5 years). However, this included group homes, emergency shelters, psychiatric hospitals, residential treatment facilities, detention centers, and temporary accommodation. This heterogeneity and overlap with the homeless populations in other studies makes interpretation of the results for foster care difficult.

Poverty

Almost all of the included studies indexed poverty using SES. Indicators of SES are diverse across studies: parental education ($n = 15$), parental occupation ($n = 7$) and family income ($n = 10$) are used either in combination or isolation. One study uses eligibility for free school meals. A handful of studies use indicators to calculate ratios

($n = 3$) such as a poverty index ratio, where annual family income and family size are compared to the federal poverty line (see e.g., Alaimo, Olson, & Frongillo, 2001). Some studies use indexes ($n = 6$), for example the Hollingshead Social Status Index (Hollingshead, 2011). Neighborhood SES is assessed in six studies, either as a single indicator or in combination with other indicators of SES. The indicators are measured in different ways: some are split into categories or levels, others use a median split, and still others use a continuous measure.

Quality Assessment

Overall ratings range from between one out of six stars ($n = 1$) to six out of seven stars ($n = 4$), with the majority of studies receiving at least half of the total stars available (total available differs depending on design, see Table 2). Twelve studies scored 70% or greater overall. However, several studies do not present basic demographic and descriptive data. Reporting of definition and duration of homelessness, foster care, or poverty is variable, and several studies have limitations associated with sampling. Often, studies use convenience sampling (e.g., from a local hostel or other support program) or the sampling methods are not sufficiently described. For example, some studies recruited participants from poor or low-income neighborhoods or describe participants as being from poor backgrounds without offering further explanation. Many studies do not attempt to control for number of years of education. Relevant comparison groups are lacking in a third of studies ($n = 11$). Although many studies use standardized tests, the measures reported vary greatly. In addition, whether the scores are raw or converted to standard scores is inconsistent. This limits the extent to which comparisons can be made across studies.

Comparisons to Young People Who Have Not Experienced Homelessness, Foster Care, or Poverty

Seven of the included studies compare young people who have experienced homelessness, foster care, or poverty to a control group who have not had these experiences. Young people from low SES families tend to perform at a lower level on tests of general cognitive functioning (Chapell & Overton, 2002; Ornoy et al., 2010; but see Skoe, Krizman, & Kraus, 2013), and working memory (Skoe et al., 2013) than their high SES counterparts. No differences are found in memory or language performance (Lupien, King, Meaney, & McEwen, 2001). One low SES group demonstrated superior performance compared to the high SES group on a selective attention task (Lupien et al., 2001), though Tine (2014) found the opposite result. Young people who have experienced homelessness demonstrate poorer performance on selective attention and memory tasks compared to age-matched controls (Borges-Murphy et al., 2012). In the foster care category, Vinnerljung and Hjern (2011) found impaired general cognitive functioning in young people who have experienced foster care compared to the general population. Overall, young people who have experienced homelessness, foster care, or poverty seem to show cognitive difficulties to a greater extent than their peers without these experiences.



Table 2 Quality Assessment of Included Studies Using Adapted Newcastle Ottawa Scale.

Study	Design	Selection			Comparability		Outcome		
		Definition / ascertainment of exposure	Representativeness	Selection of non- exposed /controls	Definition of controls	Based on study design or analysis (max. 2 stars)	Assessment of outcome	Same method of ascertainment	Follow-up/ non- responders
Homelessness									
Borges-Murphy et al. (2012)	Case-control	-	-	-	-	★	★	★	-
Dahlman et al. (2013)	Case-control	★	-	★	★	★	★	★	-
Pluck et al. (2015)	Norm comparison	-	-	★	★	★	★	★	-
Rafferty et al. (2004)	Case-control	★	-	★	★	★	★	★	★
Rohde et al. (1999)	Norm comparison	★	-	-	-	★	★	★	★
Saperstein et al. (2014)	Norm comparison	-	-	-	★	★	★	★	-
Foster care									
Berger et al. (2009)	Cohort	★	-	★	-	★	★	★	-
Kira et al. (2012)	Cohort	-	-	★	-	★	★	★	-
Vinnerljung & Hjerm (2011)	Cohort	★	★	★	-	★	★	★	★
Poverty									
Alaimo et al. (2001)	Cohort	★	★	★	-	★	★	★	-
Campbell et al. (2002)	Norm comparison	★	★	-	-	★	★	★	-
Chappell & Overton (2002)	Cohort	★	-	★	★	★	★	★	-
Coles et al. (2002)	Norm comparison	-	-	-	-	★	★	★	-
Evans & Schamberg (2009)	Cohort	★	-	★	-	★	★	★	-
Flouri et al. (2013)	Cohort	★	★	★	-	★	★	★	★
Goldberg et al. (2011)	Cohort	★	★	★	-	★	-	-	★

(Continued)

Table 2 (Continued).

Study	Design	Selection				Comparability			Outcome	
		Definition / ascertainment of exposure	Representativeness	Selection of non- exposed /controls	Definition of controls	Based on study design or analysis (max. 2 stars)	Assessment of outcome	Same method of ascertainment	Follow-up/ non- responders	
Hackman et al. (2014)	Cohort	★	-	★		-	★		★	
Hemmingsson et al. (2007)	Cohort	★	★	★		-	★		★	
Howell et al. (2006)	Norm comparison	★	-			-	★		-	
Ivanovic et al. (2000)	Norm comparison	★	-			★	★		-	
Johnson et al. (2010)	Norm comparison	★	★			-	★		-	
Kramer et al. (1995)	Cohort	★	★	★		-	★		★	
Kobrosly et al. (2011)	Cohort	★	★	★		-	★		★	
Lupien et al. (2001)	Case-control	★	-	★	★	★	-	★	-	
Myerson et al. (1998)	Cohort	★	★	★		-	★		-	
Ornoy et al. (2010)	Case-control	★	-	-		-	★	★	-	
Robey et al. (2014)	Norm comparison	-	-			-	★		★	
Skoe et al. (2013)	Case-control	★	-	★	★	★	★	★	-	
Staiano et al. (2012)	Norm comparison	-	-			-	★		-	
Tine (2014)	Case-control	★	-	★	★	-	★	★	-	
Walker et al. (2005)	Norm comparison	-	-			-	★	★	★	

Note. "★" denotes a star awarded for an item; "-" denotes a star not awarded for an item; gray denotes that the item is not applicable (dependent on design). The maximum number of stars that can be awarded differs by design: case-control = 9, cohort = 7, norm comparison = 6

Comparisons to Norms

A further nine studies were compared to available norms (two by the authors themselves) for the cognitive tests used (see [Table 1](#)). The performance of young people who have experienced poverty tends to be below the normative averages in the domains of general cognitive functioning (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Howell, Lynch, Platzman, Smith, & Coles, 2006; Walker, Chang, Powell, & Grantham-McGregor, 2005; but see Ivanovic et al., 2000) and sustained attention (Coles, Platzman, Lynch, & Freides, 2002; Robey, Buckingham-Howes, Salmeron, Black, & Riggins, 2014). Conversely, young people who have experienced poverty are comparable with norms on tests of verbal memory and executive function (Robey et al., 2014). Performance on tests of working memory is variable (Robey et al., 2014; Walker et al., 2005). In the homeless category, Saperstein et al. (2014) found impaired performance compared to norms in their sample on tests of general cognitive functioning, executive function, working memory, attention, and verbal memory. General cognitive functioning was also found to be low in Pluck et al.'s (2015) sample of former street youth. However, Rohde et al. (1999) found general cognitive functioning to be within the average range of performance among street youth. Collectively, the poverty groups tend to show performance below the normative averages across a range of cognitive domains, albeit with inconsistencies, and there is some evidence of low general cognitive functioning among homeless young people.

Associations with Cognitive Functioning

Eleven studies investigate the relationship between experiences of poverty or foster care and cognitive functioning. The relationship between homelessness and cognitive functioning is not examined in any study. Higher levels of poverty are consistently associated with impairments in general cognitive functioning (Alaimo et al., 2001; Flouri et al., 2013; Goldberg et al., 2011; Johnson, Beitchman, & Brownlie, 2010; Kramer, Allen, & Gergen, 1995; Myerson, Rank, Raines, & Schnitzler, 1998), working memory (Evans & Schamberg, 2009; Hackman et al., 2014), and language (Johnson et al., 2010), as well as executive function, attention, learning and memory (Kobrosly et al., 2011). One study reports a greater percentage of low SES young men in the lower IQ bands than in the higher IQ bands (Hemmingsson, Essen, Melin, Allebeck, & Lundberg, 2007). Neighborhood SES is not found to be associated with working memory (Hackman et al., 2014). The results for foster care are mixed: while Kira et al. (2012) found an association between foster care and working memory with a small sample ($n = 12$ with experience of foster care), Berger et al. (2009) found no relationship between having experienced out-of-home care and general cognitive functioning. Altogether, poverty is consistently associated with many aspects of cognitive functioning; evidence for a link between foster care and cognition is less clear.

Comparisons among Young People with Similar Experiences

Two studies compare young people who have experienced homelessness to housed young people in low SES families (Dahlman et al., 2013; Rafferty et al., 2004). In both

cases, no differences are observed between the two groups in terms of general cognitive functioning, though both groups performed below average. Dahlman et al.'s (2013) sample is also comparable on measures of executive function; yet the homeless group outperformed the low SES group on a measure of creativity. No other studies make direct comparisons between groups with similar experiences.

Looking across studies, all groups show impairment on working memory tasks (Evans & Schamberg, 2009; Hackman et al., 2014; Kira et al., 2012; Robey et al., 2014; Saperstein et al., 2014; Skoe et al., 2013). Those who have experienced homelessness or poverty also demonstrate poorer performance on tasks assessing general cognitive functioning, attention, and executive function (Campbell et al., 2002; Howell et al., 2006; Kobrosly et al., 2011; Ornoy et al., 2010; Pluck et al., 2015; Saperstein et al., 2014).

Relationships with Mental Health

The majority of studies (88%) found cognitive functioning and mental health to be related (Table 3). All but one study (Berger et al., 2009) found relationships between aspects of mental health and general cognitive functioning (seven out of eight). In one study (Saperstein et al., 2014), 64% of homeless young people with a broad range of mental health disorders also scored one standard deviation (SD) or more below the normative mean in one or more cognitive domains, with particular difficulties in verbal and working memory. A negative relationship was found between depressive symptoms and verbal IQ in homeless youth (Rohde et al., 1999). While Kira et al. (2012) found a negative indirect relationship between PTSD and both working memory and general cognitive functioning in young people who have experienced foster care, Pluck et al. (2015) found a positive association between PTSD and general cognitive functioning in street youth. Two studies found general cognitive functioning to be negatively associated with internalizing symptoms and/or externalizing problems in low SES young people, though one found this association for parent-reported problems only (Flouri et al., 2013; Ornoy et al., 2010). No relationship was found between general cognitive functioning and internalizing symptoms and/or externalizing problems in the foster care group (Berger et al., 2009). Finally, intelligence was found to moderate the relationship between SES and hospitalization for schizophrenia such that for those with average to high intelligence there is no relationship, but for those with low intelligence, *high SES* is associated with schizophrenia (Goldberg et al., 2011). Generally, mental health and cognitive functioning were found to be associated in young people who have experienced homelessness, foster care, or poverty, but some of these relationships are more complex than expected.

Discussion

This systematic review examines cognitive functioning in both young people who have experienced homelessness, foster care, or poverty, and who have not had such experiences. A total of 31 studies were eligible for inclusion. The search strategy was deliberately broad in an attempt to access all of the relevant studies. By synthesizing evidence across three bodies of literature, this review makes comparisons both within groups of youth who have experienced homelessness, foster care, and poverty and



Table 3. Relations between Cognitive Functioning and Mental Health in Young People Who Have Experienced Homelessness, Foster Care, or Poverty.

Study	Cognitive domain	Aspect of mental health	Test or criteria used	Relationship
Homelessness				
Dahlman et al. (2013)	General cognitive functioning; Executive function	Emotion symptoms (pain, worry, sadness, anxiety, fear)	Strengths and Difficulties Questionnaire	No differences between groups. Does not assess potential relationships between cognitive functioning and emotion symptoms.
Pluck et al. (2015)	General cognitive functioning	PTSD	UCLA PTSD Index	Street youth with probable PTSD outperformed those without probable PTSD on tests of general cognitive functioning.
Rohde et al. (1999)	General cognitive functioning	Anxiety; Depression; Suicidal behavior	State-Trait Anxiety Inventory; Center for Epidemiologic Studies Depression Scale; Current, lifetime, and history of suicide	Verbal IQ negatively related to current depressive symptoms but not to anxiety or suicidal behavior. No association found between performance IQ and any mental health measure.
Saperstein et al. (2014)	General cognitive functioning; Verbal memory Working memory; Attention; Executive function	Axis I disorders	Beck Depression Inventory; Beck Anxiety Symptom Checklist-90 Revised	63.6% of homeless youth with mental health disorders screened for cognitive impairment. Cognitive impairment and mental health disorder predict worse outcomes than either alone.
Foster care				
Berger et al. (2009)	General cognitive functioning	Internalizing/externalizing behavior	Child Behavior Checklist	No relationship found between general cognitive functioning and internalizing or externalizing behavior.
Kira et al. (2012)	General cognitive functioning; Working memory	PTSD	Clinician Administered PTSD Scale-2; Clinical interview	PTSD negatively indirectly related to performance on tests of working memory and general cognitive functioning.
Poverty				
Flouri et al. (2013)	General cognitive functioning	Emotional and behavioral problems	Strengths and Difficulties Questionnaire	General cognitive functioning significantly negatively associated with emotional symptoms and conduct problems.
Goldberg et al. (2011)	General cognitive functioning	Schizophrenia	ICD-10	For those with an average to high IQ, SES not related to schizophrenia. For those with a low IQ, high SES associated with schizophrenia
Omoy et al. (2010)	General cognitive functioning	Internalizing/externalizing problems ADHD	Child Behavior Checklist; Youth Self-Report Conners' Rating Scales	General cognitive functioning scores significantly negatively correlated with ADHD and parents' report of internalizing and externalizing problems. No relationship found between general cognitive functioning and self-reported internalizing and externalizing problems.

Note. ADHD = attention deficit hyperactivity disorder; ICD-10 = International Statistical Classification of Diseases and Related Health Problems – 10th Edition; PTSD = post-traumatic stress disorder; SES = socioeconomic status; UCLA PTSD Index = University of California, Los Angeles PTSD Index.

between these groups and comparatively advantaged young people, which has not been done before. In the foster care literature in particular, no reviews include studies where cognitive functioning is assessed using objective tests. Reviews in the poverty literature tend to focus on predominantly child or adult studies (Bradley & Corwyn, 2002; Hackman & Farah, 2009). Finally, though Parks et al. (2007) systematically review the literature on cognitive functioning in homeless young people, only two studies were found in the adolescent age range despite using extremely broad criteria, and comparisons with other relatively disadvantaged groups are not made.

Overall, young people who have experienced homelessness, foster care, or poverty tend to demonstrate poorer performance on cognitive tasks than young people who have not had these experiences, or are found to show below average performance compared to published norms. Poverty is consistently associated with performance across a wide range of cognitive domains, while the findings for foster care are mixed. Only two studies found potential strengths: selective attention among young people who have experienced poverty (Lupien et al., 2001; though see Tine, 2014), and creativity among young people living on the street (Dahlman et al., 2013). It could be the case that creativity, or divergent thinking, is more adaptive than convergent thinking (e.g., as assessed by set shifting) in deprived and risky environments such as the street (Cohen, 2012). Alternatively, greater creativity could increase the risk of homelessness through its relationship with greater impulsivity (Feist, 1998), via increased risk-taking behavior, for example.

Working memory emerges as a likely impairment for all groups, with poorer performance on attention and executive function tasks apparent in young people who have experienced homelessness and poverty. General cognitive functioning is most consistently impaired in young people who have experienced poverty or homelessness, with conflicting findings for the foster care group. Where direct comparisons are made between disadvantaged groups, no differences in performance were found for low SES young people and homeless young people on tests of general cognitive functioning and executive function, though the performance of both groups is below average compared to norms. However, as the effect sizes are small, it is debatable as to whether the sample sizes used in these studies are large enough to have been able to detect a difference.

In the studies that assess mental health in addition to cognitive functioning, relationships are identified between mental health and general cognitive functioning, attention, executive function, and memory. Generally, mental health problems (depression, PTSD, internalizing symptoms, externalizing problems) are associated with lower levels of cognitive functioning, with two exceptions (Goldberg et al., 2011; Pluck et al., 2015; see Table 3). In homeless young people, 64% of those with one or more psychiatric disorders also demonstrate impaired cognitive functioning compared to norms, especially in verbal and working memory (Saperstein et al., 2014). However, this is only a preliminary examination of the relationship between cognition and mental health in young, disadvantaged populations. More research is required to understand the interplay between cognitive functioning and mental health in vulnerable young people.

The results suggest that at least some young people who have experienced homelessness, foster care, or poverty have less well-developed cognitive skills and abilities than those who have not had such experiences. Whether cognitive difficulties precede or develop as a result of homelessness, foster care, or poverty experiences, or indeed

both, is undetermined. However, what is clear is that these young people are likely to be especially vulnerable, particularly given the relationships found with mental health problems. Shared difficulties among groups with similar experiences, such as in working memory, suggest that there may be factors common to all disadvantaged groups that are related to cognitive functioning. When directly compared, homeless and poverty groups appear not to differ in levels of cognitive functioning. However, in terms of stressful experiences and exposure to risk factors, the particular samples used could be argued to be similar, which theoretically places them in fairly close proximity on the continuum of risk (Masten et al., 1993). Alternatively, as previously noted, the studies may not possess enough statistical power to detect any differences in cognitive functioning that might be present.

In practice, services for groups with adverse experiences (e.g., homeless young people) do not routinely assess cognitive functioning (Solliday-McRoy, Campbell, Melchert, Young, & Cisler, 2004). Cognitive functioning also tends to be neglected in research on vulnerable young people, with most studies focusing on factors such as trauma, substance use, and mental health (e.g., Toro et al., 2007). The evidence presented here suggests that cognitive functioning may be associated with experiences of homelessness, foster care, or poverty. Two factors that have been identified as resilience-promoting factors are parental support and cognitive functioning (Cutuli & Herbers, 2014; Masten et al., 1999). Young people who have experienced homelessness or foster care are likely to have inadequate support from parents (Milburn et al., 2005), and due to added pressures such as needing to work multiple jobs, young people in poverty may receive limited time with and support from parents compared to those who are not impoverished.

In addition, some cognitive skills may show improvement with training (see e.g., Løhaugen et al., 2011). Although this is still a controversial area of research (Klingberg, 2010; Melby-Lervåg & Hulme, 2013; Morrison & Chein, 2011; Shipstead et al., 2012), cognitive skills training can be of particular benefit to low SES children (Jolles & Crone, 2012). Furthermore, there is recent evidence of some generalization beyond trained tasks in a naturalistic setting; participants demonstrated some improvement in both working memory (on trained and untrained tasks) and academic performance in schools following teacher-delivered working memory training (Holmes & Gathercole, 2014). Although most research has focused on working memory training, it may be that other types of cognitive skills training are more feasible and potentially more effective; further investigation is required. Aspects of cognitive functioning may therefore constitute a potentially promising target for intervention. Late adolescence and emerging adulthood could represent an opportunity to intervene in order to enhance or increase cognitive functioning among young people as this period encompasses a sensitive period of brain development (Steinberg, 2005). By improving their cognitive functioning, young people who have experienced homelessness, foster care, or poverty may be better able to adapt and subsequently experience more success not only in terms of education and employment, but also in everyday living (Sternberg et al., 2000).

There are some limitations to note. Despite broad inclusion criteria, the searches yielded few studies, especially in the homelessness and foster care literatures. The definitions and duration of the experiences of homelessness, foster care, and poverty vary considerably between studies, making it difficult to draw firm conclusions. Related

to this, the groups of interest in some studies may have included participants from other disadvantaged groups. For example, one study, which had a broad definition of out-of-home care, likely also included those that were homeless as well as those who had experienced foster care (Berger et al., 2009). The majority of included studies score 50% on their quality assessments, with 12 scoring more than 70% overall. Many studies scored poorly on representativeness though, using convenience sampling or sampling methods that are not fully described. Often, reporting quality is not sufficient to merit awarding a star in a given category. Comparison groups are not used in one third of the studies.

Attempts have been made to reduce the risk of bias when conducting this review by having several stages cross-checked by other researchers, which were then compared and discussed. Possible sources of bias include limiting searches to those articles published in English, as well as including only journal articles. Although the majority of journal articles are peer-reviewed and thus meet many standards for quality, it could be argued that valuable information on the groups of interest was available in the gray literature, that is, research and reports by governments and organizations (such as charities) that are unlikely to have been peer-reviewed. Nevertheless, the focus of this review is objective cognitive tests, which are more likely to be found in journal articles. The markedly high initial return of more than 20,000 articles did raise some concerns, but the search strategy was deliberately broad due to attempting to bridge three separate literatures relating to cognitive functioning.

Considering the potential importance of cognitive skills for adaptation and the added vulnerability which cognitive impairment may confer, the relative paucity of research on cognitive functioning in young people with experience of adversity needs to be addressed. In particular, there needs to be more investigation of cognitive functioning in young people who have experienced homelessness or foster care, making comparisons with both disadvantaged and non-disadvantaged groups. The relationship between cognitive difficulties and mental health issues in young people who have experienced homelessness, foster care, or poverty also warrants examination, as the presence of both has been shown to predict worse outcomes than either in isolation (Saperstein et al., 2014). As most research among vulnerable young people focuses on impairment or negative outcomes, an assessment of areas of strength is required to fully explore resilience and positive/adaptive development in this age group, and may offer valuable avenues for intervention. Studying cognition in young people whose cognitive development is likely disrupted is valuable for cognitive and developmental psychology more broadly, as it enables the discovery of potential risk and protective factors to typical cognitive development (Rutter & Sroufe, 2000).

Conclusion

The cognitive performance of young people who have experienced homelessness, foster care, or poverty tends to be below that of their non-disadvantaged peers. The evidence presented in this review highlights the importance of cognitive functioning, which may be neglected in vulnerable populations in favor of more immediate needs (Backer & Howard, 2007). Cognitive functioning in young people who have had adverse experiences

apparently attracts little research attention, with a particular dearth of research on cognitive functioning in young people who are homeless or in foster care. Studies instead tend to focus on factors such as mental health, substance abuse, and trauma (e.g., Toro et al., 2007). While these factors are important, cognitive functioning and its potential for positive adaptation should not be ignored. More research is needed in this age range with well-defined groups to both provide a clearer picture of cognitive profiles in disadvantaged young people and investigate how cognitive functioning interacts with mental health, with implications for educational and occupational outcomes.

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ORCID

Charlotte E. Fry  <http://orcid.org/0000-0002-1221-1281>

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