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Money Matters for Early Education: The Relationships among Child Care Quality, Teacher Characteristics, and Subsidy Status

JeanMarie St.Clair-Christman
Pennsylvania State University York

Martha Buell & Michael Gamel-McCormick
University of Delaware

Abstract

Child care is the first out-of-home learning opportunity for many children. For low-income children, a high-quality child care placement can provide many of the experiences and skills that help build a foundation for later school success. Among the many measures of child care quality, some closely linked to later success in school are those assessing learning activities and children's opportunities to develop language and reasoning skills. Previous research in this area reveals that teacher characteristics such as education and wages are related to child care quality. However, there is less research on how funding streams, such as the federal child care subsidy program, influence child care quality. Using a sample from the Delaware (USA) Early Care and Education Baseline Quality Study, regression analysis was used to examine the relationships among teacher characteristics, program subsidy status, and the quality of care as defined by measures of language and reasoning and learning activities. The results indicate a relationship between child care quality and program subsidy status: Programs that do not accept subsidy funds are more likely to offer high-quality programming in language and reasoning activities that have a positive impact on children's development and school readiness.

Introduction

Child care in center-based settings is a common experience for many American children in working-class families. As a result of the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996, more low-income mothers are entering the workforce; the need for high-quality, affordable, child care has become critical (Growing Up in Poverty Project, 2000). High-quality child care can play an important role in the positive growth and development of children. Research shows that outcomes related to quality include cooperative play, creativity, self-control, and language and cognitive development (Vandivere, Pitzer, Halle, & Hair, 2004; WestEd, 2002).

Some policy makers have recognized that early care and education can be a means of preparing children for success in school. With its policy initiative “Good Start, Grow Smart,” the Bush administration put into place state-level voluntary guidelines for emergent literacy and quality criteria in early childhood education programs as part of state plans for Child Care and Development Funds. Families are usually required to be working or enrolled in school in order to qualify. As the Obama administration prepares its own initiatives, such as “Race to the Top,” many states have continued to follow the “Good Start, Grow Smart” guidelines. The “Good Start, Grow Smart” voluntary quality guidelines allow states to require high-quality literacy environments and overall high educational quality from programs receiving child care subsidy funds (Good Start, Grow Smart, n.d.).

Researchers have explored many factors that contribute to child care program quality, including physical environment, curriculum, interaction, schedule and program structure, and parent and staff education (U.S. Department of Health and Human Services, Administration for Children and Families, Head Start Bureau, 2003; National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network & Duncan, 2003). The types of learning activities used in the classroom and opportunities for language and reasoning development are important for children's academic, social, and personal growth. The National Association of the Education of Young Children's Standards of Excellence and its position statement on developmentally appropriate practice, emphasize the importance of both developmentally appropriate learning activities and promoting language and reasoning (Bredekamp & Copple, 1997; National Association for the Education of Young Children [NAEYC], 1995b, 2009).

Teacher characteristics have been shown to have an impact on the quality of both the activities provided and the language environment in early care and educational settings (NICHD Early Child Care Research Network, 1996, 2000). NAEYC states "the aspects that most influence a program's ability to provide high-quality services revolve around characteristics of the staff" (NAEYC, 1995a, p. 2). Classroom quality has been shown to be associated with teacher qualifications, ability, and dispositions. Lack of staff commitment and stability has been associated with lower quality programming and lower child language skill levels (Adams, Tout, & Zaslow, 2007). Research also shows that staff education level is related to child care quality in general (NICHD Early Child Care Research Network & Duncan, 2003; Weaver, 2002).

Literacy skills of child care teachers and providers vary widely. Teacher compensation has been shown to be associated with teacher literacy levels as well as the literacy environments they provide; research indicates that teachers with higher literacy levels provide better quality literacy environments than do teachers with lower literacy levels (Barnett, 2003; NAEYC, 1995a; Phillips, Crowell, Whitebook, & Bellm, 2003).

The relationship between wages and child care program quality is of concern given that teacher salaries are not improving at the same pace as other sectors of the workforce. Vandell and Wolfe (2000) found no improvement in terms of the relative salaries between 1992 and 1997 for most levels of education in the child care work force. High school graduates who were child care teachers or assistants earned between 73% and 85% of the salaries that they might expect to receive elsewhere; a child care teacher with a B.A. degree could expect to earn between 52% and 75% of the median salaries across all occupations. This finding means that typical child care program salaries are probably not sufficient to attract and retain staff members who have had training and education to prepare them to be able to structure emotionally supportive and cognitively stimulating learning environments (Vandell & Wolfe, 2000).

In addition to considering the apparent connections among teachers' salaries, teachers' education, and program quality, it is also important to examine affordability and accessibility in relationship to quality of child care programs. Several studies have found that the cost of child care affects a mother's decision to work (Lemke, Witte, Queralt, & Witt, 2000; Li-Grining & Coley, 2006; Ross & Paulsell, 1998). Researchers from the Growing Up in Poverty Project (2000) looked at former welfare recipients in California, Connecticut, and Florida and found that the quality of child care programs differed significantly according to the cost. Other studies, such as the Massachusetts Cost/Quality Study have found that cost is associated with quality in family child care centers (Marshall et al., 2003). Unfortunately, this relationship between program quality and cost to families means that high-quality programs tend to be out of reach for many families (Schulman & Blank, 2004). Subsidy policies attempt to address this issue by making child care more affordable for low-income families.

Federal policies that govern child care subsidy funds are called upon to balance accessibility (supporting as many families as possible with means to purchase child care) with the need to provide sufficient reimbursement so that high-quality care can be purchased. However, federal policies provide guidance—but no mandate—concerning the amount that child care programs should be reimbursed for the services they provide. The guidance from the 2006 statute reads:

> The explanation of how rates ensure equal access should include a description of how the rates correspond to market prices as evidenced by the survey. For example, the explanation might include: *"Rates for center-based and regulated family child care are set at the 75th percentile of market charges as demonstrated by our local market survey. Rates for unregulated providers are set at 50 percent of family child care home rates as a sufficient number of unregulated providers could not be identified and surveyed. Additionally, unregulated providers are not currently required to undertake the same high level of ongoing training as are the regulated providers. Rates for unregulated providers were set at a lower amount in the past and we experienced no reluctance to provide care at that rate."* (U.S. Department of Health and Human Services, 2010-2011, 3.2.6)

As a consequence, there is great variance among states in the amount they reimburse for child care services, with many states setting their rates far below the market rate. According to a 2004 National Women's Law Center Report (Schulman & Blank, 2004), eight states reported reimbursing at 75% of the 2003 market rate, and only one state, North Dakota, reported reimbursing at or above the 75th percentile of the 2003 market rate. Conversely, some states are reimbursing at significantly lower rates. For instance, Iowa reports that in 2004 the reimbursement rate was set at the 75th percentile of the 1998 market rate. Missouri's reported reimbursement rate was at the 1998 market rate for infants and at the 1991 market rate for all other children.

Reimbursing programs for caring for low-income children at less than the market rate allows states to use limited funds to be distributed to more families and to provide greater access to child care. However, the access that is provided may be to a limited pool of early care and education providers—those who will accept reimbursement below the market rate. (Providers of higher quality programs may want to help low-income families but may be only able to take a small number of subsidized children because of the inadequate reimbursement.) As a result, families using child care subsidy funds may not have access to high-quality care, because when child care subsidy funds do not cover the full cost of the care provided, it becomes difficult for early care and education programs to sustain high-quality services.

Research Question

Given the potentially conflicting goals of providing access to early care and education programs for families living in poverty and providing high-quality programming for children in order to support their development and learning, it is necessary to examine how child care subsidy policies are interacting with teacher characteristics to influence the quality of programming that children, particularly low-income children, are receiving. In this study, we set out to explore the question: What is the relationship among specific teacher characteristics, a program's acceptance of federal child care subsidy funds, and the quality of language and reasoning and learning activities provided by the program?

Methods

The Delaware Early Care and Education Baseline Quality Study (Gamel-McCormick, Buell, Amsden, & Fahey, 2005) was commissioned by the Delaware Early Care and Education Office of the Department of Education, the Office of Child Care Licensing of the Department of Services for Children, Youth and Their Families, and the Division of Social Services of the Department of Health and Social Services. The study examined a sample of all types of early care and education programs in the state of Delaware. This included full-day center-based child care programs, licensed family child care programs, part-day early education programs, school-age care programs, and Head Start and Early Childhood Assistance Programs (ECAP) (Gamel-McCormick et al., 2005).

The sample for this analysis included data from observations and interviews from 62 of the 73 child care programs that were eligible to participate in the Baseline Quality Study. The 62 programs who participated offered full-day, full-year care to either preschoolers (3- to 5-year-olds) or infants and toddlers (6 weeks to 36 months). The child care subsidy reimbursement rate at the time that these data were collected was below 75% of the market rate for the year. This reimbursement rate was comparable to or above 32 of the other 50 states at the time of the data collection.

Data Collection

Demographic Data Measurements

Three different instruments were used to collect demographic information about the programs, teachers, and program directors in the sample. A *Pre-visit Program Questionnaire* was sent to each program that agreed to participate in the study. This questionnaire sought information such as number of children enrolled in the program, the ages of the children, the number of staff members, and the hours of operation of the program. This questionnaire was completed by the program director or family child care provider prior to the observation visit.

Two types of interviews were also used to collect demographic data. A *Director Interview* was used to collect data about staffing patterns and turnover rates, director pay rates, director training, and director knowledge and skills. Two versions of a *Teacher Interview* were used to collect further demographic information from teachers. A center-based version was used to collect information about children in the group observed, teacher training and experience, teacher pay rates, and teacher perceptions of early care and education as a career. Another version of the interview was used with family child care program teachers. All of the interviews were conducted in person by trained interviewers, who were graduate students. Interviews lasted approximately 1 hour.

Of the 62 programs included in the current research, 49 (79%) accepted child care subsidy funds. These 49 programs contained 96 preschool classrooms and 68 infant and toddler classrooms. The programs ranged in size from 1 classroom to 12 classrooms. In the 13 programs that did not accept child care subsidy funds, there were a total of 35 preschool classrooms and 25 infant and toddler classrooms. These programs ranged in size from 1 classroom to 9 classrooms. Teacher characteristics for the programs accepting and not accepting child care subsidy funds are shown in Table 1. The table provides information about teacher characteristics including age, hourly wage, education, and years in program by subsidy status and program type.

Table 1

Demographic Information: Teacher Characteristics and Subsidy Status

	Accept Child Care Subsidy		Does Not Accept Child Care Subsidy	

Teacher Characteristics	Preschool (*N* = 96)	Infant Toddler (*N* = 68)	Preschool (*N* = 35)	Infant Toddler (*N* = 25)
Age	36 (11)	39 (13)	36 (10.5)	33 (12)
Hourly wage	8.99 (2.47)	8.09 (1.84)	9.94 (2.20)	8.52 (1.82)
Years in the program	5.5 (6.9)	5.9 (7.8)	5.8 (5.0)	4.9 (4.6)
Educational quality score*	6.76 (2.64)	6.45 (2.45)	8.59 (2.08)	8.48 (5.21)
Educational level**				
High School	40%	60%	20%	44%
Some College	14.5%	19%	17%	16%
AA	14.5%	4%	8%	4%
BA	17%	19%	43%	24%

*Difference for subsidy and nonsubsidy status for both samples, $p < .05$.
**Difference for subsidy status and nonsubsidy status, significant for preschool sample, $p < .05$.

Quality Measures

Data regarding program quality were collected using the *Infant and Toddler Environment Rating Scale* (ITERS) (Harms, Cryer, & Clifford, 1990) and the *Early Childhood Environment Rating Scale-Revised* (ECERS-R) (Harms, Clifford, & Cryer, 1998). The reliability of data collectors was checked after the 5th, 15th, and 25th observations and after every 25th visit thereafter. After five observations, the next observation conducted by a data collector was conducted with a co-data collector. Both data collectors conducted the observational data collection, and reliability coefficients were calculated between the two data collectors. A total of 37 reliability visits were conducted, with an average reliability coefficient of .87 with a range of .79 to .94 (Gamel-McCormick et al., 2005).

Two subscales of quality that are included in the ITERS and ECERS-R were chosen as the focus of this analysis —*Language/Reasoning* and *Learning Activities* from the ECERS-R and *Language/Listening* and *Activities* from the ITERS. These subscales were chosen because they provide measures of the materials and key learning experiences that help to build school readiness skills for children in the areas of language and literacy and cognitive development. The *Language/Reasoning* and *Language/Listening* subscales were assessed with the following characteristics in mind: social talking to infants and toddlers, responses to sounds infants make, questions that require complex responses, suitable books available to each age group, materials that help children understand and use language such as puppets, toy telephones, puzzles, and games and materials focusing on concepts such as size, shape, color, relationship, and number.

The other quality measure was the *Learning Activities* and *Activities* subscales. It is expected that early care and education teachers offer children a variety of learning activities throughout the day. The activities subscales assess the following characteristics: eye-hand materials available for each age group, experiences with art, music and movement activities, sand and water play available indoors or outdoors, dramatic play materials available such as dolls and dress-up clothes, block building materials, use of television, science and math materials, and teacher's balance of work and personal interests. For each item in a subscale and for the subscales' averages, a rating of <3.00 was considered "poor," a rating of $\geq$3.00 <5.00 was considered "mediocre," and a rating of $\geq$5.00 was considered "good" (Helburn & Howes, 1996).

Analysis

Subsidy Status and Program Type

In order to test for differences in program characteristics between programs that do and do not accept subsidy, two multivariate analyses of variance were conducted—one with the infants and toddler sample and one with the preschool sample. In both cases, the independent variable was subsidy status, and the dependent variables were *teacher hourly wage*, *teacher educational level* (range 1 = less than high school to 7 = B.A. degree), *years in the field,* and *educational quality score* (range 2-14).

Teacher Quality and Subsidy Status

In order to further investigate the source of the differences in quality scores, the data were analyzed using a block entry regression analysis using two blocks. Block 1, Teachers, included *Hourly Wage* (in dollars), *Age of Care Provider* (in years), *Years of Experience in Program* (in years), *Years of Experience in Field* (in years), *and Education Level* (measured on a 1 to 7 scale). Block 2, Subsidy, included *Purchase of Care;* program administrators indicated whether or not a program accepted government subsidies (1 = subsidy, 2 = no subsidy). The dependent variable, *Quality*, was a continuous variable with a range of 2-14; it was developed as an aggregate score that was a combination of the averages of two 7-point scales—Learning Activities and Language and Reasoning.

Findings

Subsidy and Quality

In both cases, the multivariate analysis of variance was significant: for infants and toddlers, the Wilks's Lambda multivariate F = 3.43 (df 4, 78), p = .01; for the preschool sample, the Wilks's Lambda multivariate F = 5.06 (df 4, 104), p = .001.

Table 2 gives the means and standard deviations for the variables. For the infant and toddler sample, the only significant difference was in the quality scores, with classrooms in programs that do not accept subsidy offering higher-quality educational programming as reflected in the ITERS scores. For the preschool sample, programs that do not accept subsidy were significantly higher in terms of quality and teacher education. Although programs that do not accept subsidy also paid teachers a higher hourly wage and employed teachers who had fewer years in the field, these differences were not statistically significant.

Table 2

R^2, Adjusted R^2, and F Change: Infant and Toddler Program

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	R^2 Change	F Change	Sig f Change
1	.409	.168	.115	2.46	.168	3.82	.001
2	.515	.265	.209	2.33	.098	4.694	.000

Infant and Toddler Programs

The results of block entry regression analysis revealed a R^2 of .16 for Model 1, indicating that 16% of the variance is accounted for by Model 1. For Model 2, including the subsidy variable, the R^2 is .26, indicating that 26% of the variance is explained by both models (see Table 2). The values for adjusted R^2 are slightly less than those of the R^2. The adjusted R^2 for Model 1 is .11; Model 2 is .20 (see Table 2). The change in R^2 was significant. The F change statistics for Models 1 and 2 are significant, indicating that both blocks add to the predictive value of the model (see Table 2).

Hourly Wage, Purchase of Care, and Quality (Infant and Toddler Program)

Standardized beta coefficients provide information about the slope of the regression function and are scaled to a standard metric so they can be compared. In Model 1, the standardized beta coefficient for *Hourly Wage* was .44, p < .000, which indicated that every unit increase in *Hourly Wage* was associated with a .44 increase in *Quality* (see Table 3). In Model 2, the standardized beta coefficient for *Purchase of Care* was .32, p < .002, which indicated that every unit increase in *Purchase of Care (1 = subsidy, 2 = no subsidy)* was associated with a .32 increase in *Quality.* In Model 2, the standardized beta coefficient for *Hourly Wage* was .38, p < .001 (see Table 3). All other independent variables were not significant.

Table 3

Hourly Wage, Purchase of Care, and Quality: Infant and Toddler Program

	Unstandardized Coefficient	Standard Error	Beta	t	Sig.
Model 1					
How old are you	-.006	.028	-.029	-.217	
Hourly wage	.639	.168	.449	3.81	.000
Years of education	-.028	.077	-.040	-.367	.715
Years in the field	-.001	.053	-.004	-.023	.982
Years in program	-.033	.058	-.089	-.568	.572
Model 2					
How old are you	.005	.027	.022	.176	.860
Hourly wage	.553	.161	.389	3.44	.001
Highest educational level	-.035	.073	-.050	-.477	.635
Years in the field	.002	.050	.007	.048	.962
Years in program	-.026	.055	-.072	-.485	.629
Subsidy	1.883	.585	.321	3.22	.002

Preschool Classroom

The results of block entry regression analysis revealed a R^2 of .32 for Model 1, indicating that 32% of the

variance is accounted for by Model 1. For Model 2, including the subsidy variable, the R is .36, indicating that 36% of the variance is explained by both models (see Table 4). The values for adjusted R^2 are slightly less than those of the R^2. The adjusted R^2 for Model 1 is .29; Model 2 is .32 (see Table 4). The F change statistics for Models 1 and 2 are significant, indicating that both blocks add to the predictive value of the model (see Table 4).

Table 4

R^2, Adjusted R^2, and F Change: Preschool Classroom

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	R^2 Change	F Change	Sig f Change
1	.573	.329	.296	2.318	.268	9.895	.000
2	.604	.365	.327	2.238	.056	5.767	.018

Hourly Wage, Purchase of Care, and Quality (Preschool Classroom)

In Model 1, the standardized beta coefficient for *Hourly Wage* was .41, $p < .001$, which indicated that for every unit increase in *Hourly Wage,* there is a .41 increase in *Quality*. The standardized beta coefficient for education was .24, $p = .014$, which indicates that for every increase in education, there is a .24 increase in quality (see Table 5). In Model 2, the standardized beta coefficient for *Purchase of Care* was .20, $p = .018$, which indicated that for every unit increase in *Purchase of Care (1 = subsidy, 2 = no subsidy),* there was a .20 increase in *Quality.* In Model 2, the standardized beta coefficient for *Hourly Wage* was .41, $p < .000$ (see Table 5). All other independent variables were not significant in Model 2.

Table 5

Hourly Wage, Purchase of Care, and Quality: Preschool Classroom

	Unstandardized Coefficient	Standard Error	Beta	t	Sig.
Model 1					
How old are you	.012	.025	.052	.499	.619
Hourly wage	.412	.114	.385	3.618	.000
Years in the field	.014	.036	.043	.392	.696
Years in program	.-.006	.047	-.014	-.121	.904
Highest educational level	.353	.141	.244	2.49	.014
Model 2					
How old are you	.009	.024	.037	.370	.712
Hourly wage	.414	.111	.387	3.725	.000
Years in the field	.028	.036	.083	.772	.442
Years in program	-.010	.046	-.025	-.230	.819
Highest educational level	.258	.144	.178	1.793	.076
Subsidy	1.200	.500	.204	2.402	.018

Discussion

The results of this analysis indicate a positive relationship between teacher's salary and child care quality. If the teacher's hourly wage was higher, program quality in the areas of language and reasoning would also be higher. This finding is consistent with previous research that has found that compensation and experience influence teacher commitment, which in turn influences the quality of care experiences of children (Whitebook & Sakai, 2003). Barnett (2003) found that hourly wage was a significant predictor of quality with regard to the use of developmentally appropriate activities.

These data suggested a complex relationship between teacher educational level and the quality of care provided. Past research indicates that teachers who have undergraduate or graduate degrees are more likely to provide developmentally appropriate activities and activities that promote language development in child care settings (Cassidy, Buell, Pugh-Hoese, & Russell, 1995). In this sample, there was a relationship between education and quality for the preschool teachers in Model 1, but the relationship was not present in Model 2. No relationship between teacher educational level and program quality was found for infants and toddlers. It may be important to consider the influence of the completion of the bachelor's degree in addition to enrollment in college. More research is needed to explore how program resources interact with teachers' educational backgrounds to produce high-quality care and educational opportunities for all children, including infants and toddlers.

The results indicate a relationship between program quality and child care subsidy status. Programs that did not accept subsidy funds were more likely than programs that did accept subsidy funds to provide high-quality activities in language and reasoning, which are likely to have a positive impact on children's development and school readiness. This finding is not surprising given past research showing a relationship between program cost and quality. What is surprising is that this relationship between subsidy status and quality remained after having accounted for any variance in educational level and hourly wage. However, for infants and toddlers, this

model leaves unexplained 74% of the influences on language and reasoning and learning activity quality. For preschool classrooms, the percentage of unexplained variance is 67%. It is vital to continue seeking explanations for differences in language and reasoning and learning activity quality, such as fees for service, leadership style of the center director, and the physical setting of the centers.

Limitations

This research is limited by its focus on only one state. Because considerable variation exists in child care subsidy policies at the national level, more research must be conducted that compares the different reimbursement formulas across different states. Furthermore, the child care workforce in Delaware may have unique features that may limit the generalizability of these findings. In addition, the observational data presented here are only a snapshot of what children experience from day to day. Also, several of the independent variables in this study come from teacher reports; it is possible that teachers were not completely accurate in reporting their educational level, years of experience, or hourly wage. This study is also based on a relatively small sample, which may limit its ability to capture the scope of these issues.

Implications for Research, Policy, and Practice

The federal government has made a decision to provide child care subsidy funds to families to help the adults in those households to pursue training or formal education for preparation for employment or to support the adult household members to continue their employment. The policy is designed to provide low-income families with access to early care and education programming in order to support gainful employment. There has been no explicit discussion of the quality of the care and education services provided to children once they gain access to the programs via the subsidies.

New legislation is beginning to recast child care as both a work support for parents and an educational opportunity for children. With this revised vision, we can address the need for a child care subsidy program that provides access to early care and education services and be assured that the services are of high quality. In order to maximize the educational opportunities, a reexamination of how funds flow to resources and support programs is necessary. Programs must be funded at levels that allow them to hire and retain qualified staff. This means that the formulas used to calculate the reimbursement rates for child care subsidy must be revised. Decision makers need to reconsider the effect of the suggestion offered by the legislative guidance—that 75% of the market rate is an appropriate level of reimbursement.

However, reimbursement rate increases may hurt low-income families more than they help them. If the reimbursement rates go up, fewer people may have access to these supports to pay for child care. Future research must examine which has greater long-term benefits to society—supporting children's educational opportunities or supporting more families to work. These are hard questions that deserve careful consideration. More research needs to be done to enable stakeholders to better understand this complex issue.

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Author Information

JeanMarie St.Clair-Christman is an assistant professor of Human Development and Family Studies at Penn State York. She is the former director of a TRIO program, a federal, nonprofit program for "at-risk" youth. She is currently conducting research that focuses on family involvement in education for low-income families. Her research interests include educational equity for low-income families, risk and resilience in adolescence and emerging adulthood, and experiential education for human service and social work students.

JeanMarie St.Clair-Christman, Ph.D.
Human Development and Family Studies
Penn State York
York, PA 17403-3326
Telephone: 717-771-4161
Email: Jmscc@psu.edu

Martha Buell is a professor in the Department of Human Development and Family Studies at University of Delaware and is the director of the Delaware Institute for Excellence in Early Childhood. Her area of interest is teacher development and early childhood education, especially in the areas of language and literacy development. She teaches classes in early childhood curriculum, and her research focuses on factors that influence the professional development of early childhood teachers and child care providers. In the past, she has worked on several projects examining the quality of child care and how teacher education contributes to that quality.

Email: mjbuell@udel.edu

Michael Gamel-McCormick is a professor of Human Development and Family Studies at University of Delaware. A leader in disability studies, Professor Gamel-McCormick serves as president of the Association of University Centers on Disabilities. He specializes in special education and early childhood education. His work includes factors that affect outcomes, including family support, poverty, inclusion, and mainstreaming. He is an expert in federal disability policy.

Email: mgm@udel.edu