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**Профессиональный иностранный язык для аспирантов.
Задания для самостоятельной работы**

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Методические указания «Профессиональный иностранный язык для аспирантов. Задания для самостоятельной работы» содержат теоретический материал и задания для самостоятельной работы, формирующие коммуникативную и языковую компетенции. Представлены аутентичные научные статьи для перевода и реферирования. Задания для самостоятельной работы способствуют вхождению аспирантов в сферу профессиональной и научной деятельности. Представленные методические указания соответствуют требованиям ФГОС ВО для третьей ступени высшего образования. Предназначены для аспирантов всех направлений подготовки очной и заочной форм обучения, изучающих дисциплину «Профессиональный иностранный язык»

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Периодика.

С каким потоком информации на иностранных языках сталкивается современный исследователь? В мире ежегодно издается более 100 тысяч научно-технических журналов на 60 языках. Пишется около миллиона статей, регистрируется более 400 тысяч патентов; пишется более 250 тысяч научных отчетов. Ежегодно выпускается 200 тысяч наименований книг, 50% научно-технической литературы издается на языках, с которыми не знакома большая часть ученых. Например, статьи по химии печатаются в 6 тысячах периодических изданий на 36 языках.

Научно-техническую информацию, поступающую к нам, можно разделить на три потока:

- ***патентную литературу***, являющуюся основной формой обмена, так как все новое в области науки и техники официально оформляется в виде патента и его производных форм;
- ***периодику***, специально предназначенную для обмена научно-технической информацией, например: отраслевые бюллетени, содержащие рефераты, аннотации, названия, отраслевые научно-технические журналы, содержащие дискуссионные, проблематичные и отчетные статьи специального характера, библиографические указатели с названием тем, изобретений и предметов промышленной продукции, также иногда содержащие аннотации и тематические обзоры работ по данной отрасли;
- ***различные периодические и непериодические издания*** и другие источники информации, не предназначенные специально для научно-технического обмена, но которые могут быть использованы для этой цели, например: специальные журналы и книги, рекламные материалы, инструкции и другие подобные источники специальной информации.

В зависимости от практической ценности поступающие к нам в процессе обмена материалы обрабатываются по-разному. Вся практически используемая информация обычно обрабатывается в форме полного письменного перевода, являющегося основной

формой технического перевода. Информация, накапливаемая по определенной системе в качестве справочного и подсобного материала, а также так называемая сигнальная информация обрабатываются в форме сокращенных видов технического перевода, таких как реферативный перевод, перевод заголовков и т. д. Отсюда следует, что технический переводчик должен практически знать все виды обработки первичной информации, а также иметь в своем распоряжении определенную сумму специальных знаний, позволяющих в процессе перевода совершить переход из области старого, уже известного, в область нового, неизвестного, составляющего основное содержание оригинала.

Типы научного текста

При всем разнообразии и неравноценности степеней сложности научного текста можно выделить определенные типы или разновидности текста. Так на основании учета определенных исходных параметров для характеристики научного текста ученые выделяют семь наиболее употребительных типов научного текста.

- **Краткий информативно - дескриптивный** (например, аннотация, реферат статьи, краткая рецензия, заключение главы).
- **Полный описательно-повествовательный**, узко-специальный (например, специальная статья с описанием – экспериментов, методик, и. т.д).
- **Сокращенный** (с компрессией) **описательный**, узко- и широкоспециальный (например, определитель, сводка, справочник).
- **Полный** (повествование - описание - рассуждение) **широкоспециальный**, так называемый "нейтральный", или академический, научный стиль (например, общая статья, учебник, монография).
- **Полный повествовательно-описательный**, узко- и широкоспециальный (например, обзорная статья по истории исследования, исторические тексты и т. п.).
- **Развернутое свободное рассуждение** (например, часть обще-теоретической статьи или монографии ши-

рокоспециального или общенаучного плана).

- ***Развернутая полемика*** (например, часть общей статьи или монографии).

Естественно, что каждый тип имеет свою, присущую ему специфику. Так, например, при конкретном содержании научного произведения, описательном способе изложения и узкой специализации тематики степень повторяемости единиц будет неизбежно высокой. Это приводит к определенному стандарту или шаблону текста и дает высокую степень предсказуемости его структуры и употребляемых конструкций. В частности, в полном варианте конкретно-описательно-повествовательной разновидности (тип 2) можно предсказать явное преобладание временных форм страдательного залога - *PresentIndefinitePassive, PresentPerfect Passive, PastIndefinitePassive,* субъектного инфинитивного оборота, герундия в функции обстоятельства, причастных оборотов, тогда как в другом типе текста конкретно-повествовательно-описательном (тип 5) мы почти не встретим страдательного залога, а преобладающими временными формами будут *PastIndefiniteActive и PastPerfectActive.*

Особенности технического текста

Основной стилистической чертой научно-технического текста является точное и четкое изложение материала при почти полном отсутствии тех выразительных элементов, которые придают речи эмоциональную насыщенность, главный упор делается на логической, а не на эмоционально-чувственной стороне излагаемого.

Автор научно-технической статьи стремится к тому, чтобы исключить возможность произвольного толкования существа трактуемого предмета, вследствие чего в научной литературе почти не встречаются такие выразительные средства, как метафоры, метонимии и другие стилистические фигуры, которые широко используются в художественных произведениях для придания речи живого, образного характера.

Авторы научных произведений избегают применения этих выразительных средств, чтобы не нарушить основного принципа научно-технического языка - точности и ясности изложения мысли.

Это приводит к тому, что научно-технический текст кажется несколько суховатым, лишенным элементов эмоциональной окраски.

Правда, нужно отметить, что при всей своей стилистической отдаленности от живого разговорного языка, богатого разнообразными выразительными средствами, научно-технический текст все же включает в себя известное количество более или менее нейтральных по окраске фразеологических сочетаний технического характера, например:

infullblast	*Полной тягой*
thewireisalive	*Провод под током*
thewireisdead	*Провод отключен*

Это, не лишая текст точности, сообщает ему известную живость и разнообразие.

С точки зрения словарного состава основная особенность текста заключается в предельной насыщенности специальной терминологией, характерной для данной отрасли знания.

Термином мы называем эмоционально-нейтральное слово (словосочетание), передающее название точно определенного понятия, относящегося к той или иной области науки или техники.

Терминологическая лексика дает возможность наиболее точно, четко и экономно излагать содержание данного предмета и обеспечивает правильное понимание существа трактуемого вопроса.

В специальной литературе термины несут основную семантическую нагрузку, занимая главное место среди прочих общелитературных и служебных слов.

В отношении синтаксической структуры английские тексты научно-технического содержания отличаются своей конструктивной сложностью. Они богаты причастными, инфинитивными и герундиальными оборотами, а также некоторыми другими книжными конструкциями, которые подчас затрудняют понимание текста и ставят перед переводчиком дополнительные задачи.

Поскольку научно-технический текст насыщен терминами, несущими основную нагрузку, мы рассмотрим вопросы терминологии несколько подробнее.

В обычной речи слова, как правило, полисемантичны, т.е. они передают целый ряд значений, которые могут расходиться порой довольно широко.

Возьмем для примера сумму значений слова **table**, которые концентрируются вокруг стержневого понятия "плоскость":

стол	скрижаль
доска	таблица
плита	табель
дощечка	плоскогорье

Наряду с этим слово **table** обладает и рядом переносных значений, сохраняющих известную, хотя и более отдаленную, связь со стержневым понятием:

общество за столом
еда (то, что подается на стол)
надпись на плите

Такая многозначность слов в общелитературном языке является фактором, свидетельствующим о богатстве языковых изобразительных средств.

Лексическая многозначность придает речи гибкость и живость и позволяет выражать тончайшие оттенки мысли.

Иначе обстоит дело в научно-техническом языке; в нем главным требованием оказывается предельная точность выражения мысли, не допускающая возможности различных толкований.

Поэтому основным требованием, предъявляемым к термину, становится однозначность, т. е. наличие только одного раз навсегда установленного значения.

Фактически далеко не все термины удовлетворяют этому требованию даже в пределах одной специальности, например:

engine	*машина, двигатель, паровоз*
oil	*масло, смазочный материал, нефть*

Это обстоятельство, конечно, представляет известное затруднение для точного понимания текста и осложняет работу переводчика.

Каковы источники возникновения английской научно - технической терминологии?

Наибольшую группу составляют термины, заимствованные из иностранных языков, или искусственно созданные учеными на базе, главным образом, латинского и греческого языков, по мере развития науки и техники и появления новых понятий.

Так, например, в 1830 году появилось название нового инертного вещества *paraffin* от латинского *parumaffinis*, т. е. *мало соприкасающийся* (с другими веществами).

В 1850 г. Либих создал новое соединение путем окисления спирта. Он назвал его aldehyde, соединив первые части латинских слов:

alcohol**dehyd**rogenatum

Иногда возникали и гибридные образования вроде haemoglobin от греческого haima*кровь* и латинского globus*шар*.

Особенно много терминов появилось в Англии в XVIII и XIX веках в период бурного развития наук, при этом часть терминов из языка ученых стала проникать в общелитературный язык и сделалась всеобщим достоянием. К таким словам относятся:

dynamo, barograph, ozone, centigrade, cereal, gyroscope, sodium, potassium идр.

В XX веке возникли такие новообразования, как:

penicillin, hormone, isotope, photon, positron, radar, biochemistry, cyclotron ит. д.

Эти термины быстро стали общепонятными благодаря тесной связи новейших научных открытий с повседневной жизнью.

Все же нужно отметить, что основная масса научно-технической терминологии продолжает оставаться за пределами общелитературного языка и понятна лишь специалисту данной отрасли знания.

Вторая по величине группа терминов представляет собой общелитературные английские слова, употребляемые в специальном значении. К таким словам относятся, например:

jacket*куртка* и, вместе с тем - *кожух*
jar*кувшин* и *конденсатор*
toload*нагружать* и *заряжать*

При этом встречается употребление одного слова в разных специальных значениях, в зависимости от отрасли знания; слово **pocket***карман*, например, имеет следующие специальные значения:

воздушная яма (в авиации)
окружение (в военном деле)
мертвая зона (в радио)
гнездо месторождения (в геологии)
кабельный канал (в электротехнике)

В структурном отношении все термины можно классифицировать следующим образом:

Простыетерминытипа: oxygen, resistance, velocity.

Сложные термины, образованные путем словосложения. Составные части такого термина часто соединяются с помощью соединительного гласного:

gas + meter = gasometer

При этом иногда происходит усечение компонентов:

turbine + generator = turbogenerator
ampere + meter = ammeter

Словосочетания, компоненты которых находятся в атрибутивной связи, т. е. один из компонентов определяет другой:

directcurrent	*постоянный ток*
bariumperoxide	*перекись бария*

Нередко атрибутивный элемент сам выражен словосочетанием, представляющим собой семантическое единство. Это единство орфографически часто выражается написанием через дефис:

low-noisepenthode	*малошумный пентод*
doubling-overtest	*испытание на сгиб*

<u>Аббревиатура</u>, т.е. буквенные сокращения словосочетаний:

e.m.f. = electromotive force электродвижущаясила

Сокращению может подвергнуться часть словосочетания:

D.C. amplifier = direct current amplifier	*усилитель постоянного тока*

<u>Слоговые сокращения</u>, превратившиеся в самостоятельные слова:

loran (longrangenavigation)	*система дальней радионавигации "Лоран"*
radar (radio detection and ranging)	*радиолокация*

<u>Литерные термины</u>, в которых атрибутивная роль поручается определенной букве вследствие ее графической формы:

T - antenna	*Т-образная антенна*
V - belt	*клиновидный ремень*

Иногда эта буква является лишь условным, немотивированным символом:

X-ray*рентгеновские лучи*

При переводе терминов мы можем встретиться со следующими моментами:

а) Часть терминов, имеющих международный характер, передается путем транслитерации и не нуждается в переводе:

antenna	*антенна*
feeder	*фидер*
blooming	*блюминг*

б) Некоторые термины имеют прямые соответствия в русском языке и передаются соответствующими эквивалентами:

hydrogen	*водород*
voltage	*напряжение*

в) Известная часть терминов при переводе калькируется, т. е. передается с помощью русских слов и выражений, дословно воспроизводящих слова и выражения английского языка:

single-needleinstrument	*однострелочный аппарат*
superpowersystem	*сверхмощная система*

г) Нередко случается, что словарь не дает прямого соответствия английскому термину. В этом случае переводчик должен прибегнуть к описательному переводу, точно передающему смысл иноязычного слова в данном контексте:

video-gain	*регулировка яркости отметок от отраженных сигналов*
combustionfurnace	*печь для органического анализа*
wallbeam	*балка, уложенная вдоль поперечной стены*

При переводе терминов следует по возможности избегать употребления иноязычных слов, отдавая предпочтение словам русского происхождения:

промышленность	вместо *индустрия*
сельское хозяйство	вместо *агрикультура*
полное сопротивление	вместо *импеданс* и т.д.

Поскольку характерной чертой термина является четкость семантических границ, он обладает значительно большей самостоятельностью по отношению к контексту, чем обычные слова.

Зависимость значения термина от контекста возникает лишь при наличии в нем полисемии, т. е. если в данной области знания за термином закреплено более одного значения.

Особенности перевода технических текстов

В то время как основная трудность перевода художественной прозы заключается в необходимости интерпретации намерений автора, т.е. в передаче не только внешних фактов, но и в сохранении психологических и эмоциональных элементов, заложенных в тексте, задача, стоящая перед переводчиком научно-технического текста, лишенного эмоциональной окраски, оказывается более простой - точно передать мысль автора, лишь по возможности сохранив особенности его стиля.

Для того чтобы правильно понять научно-технический текст, надо, как уже указывалось ранее, хорошо знать данный предмет и связанную с ним английскую терминологию.

Кроме того, для правильной передачи содержания текста на русском языке нужно знать соответствующую русскую терминологию и хорошо владеть русским литературным языком.

Перевод с помощью словаря незнакомых однозначных терминов типа - **oxygen, ionosphere**, не представляет затруднений.

Иначе обстоит дело, когда одному английскому термину соответствует несколько русских, например

switch	*выключатель*
	переключатель
	коммутатор

В этом случае сознательный выбор аналога может диктоваться лишь хорошим знанием данного предмета.

Возьмем предложение:

Most of the modern radio-transmitters can communicate both telegraph and telephone signals.

Переводчик, основательно не знакомый с радиоделом и соответствующей русской терминологией, перевел бы это предложение так:

Большинство современных радиопередатчиков может

посылать как телеграфные, так и телефонные сигналы.

Однако, технически грамотный перевод должен быть следующим:

Большинство современных радиопередатчиков может работать как в телеграфном, так и в телефонном режиме.

Основными чертами русского научно-технического стиля являются строгая ясность изложения, четкость определений, лаконичность формы.

При переводе английского текста переводчик должен полно и точно передать мысль автора, облекая ее в форму, присущую русскому научно-техническому стилю и отнюдь не перенося в русский текст специфических черт английского подлинника.

Для иллюстрации остановимся на некоторых стилистико-грамматических особенностях английского текста, чуждых стилю русской научно-технической литературы:

а) В английском тексте преобладают личные формы глагола, тогда как русскому научному стилю более свойственны безличные или неопределенно-личные обороты, например:

You might ask why engineers have generally chosen to supply us with a.c. rather than d.c. for our household needs.	Можно спросить, почему для домашних надобностей обычно используется переменный, а не постоянный ток.
We know the primary coil in the ordinary transformer to have more turns than the secondary one.	Известно, что первичная обмотка обычного трансформатора имеет больше витков, чем вторичная.

б) В английских текстах описательного характера нередко употребляется будущее время для выражения обычного действия.

Руководствуясь контекстом, следует переводить такие предложения не будущим, а настоящим временем, иногда с модальным оттенком:

The zinc in the dry cell accumulates a great many excess electrons which will move to the carbon electrode.	Цинк в сухом элементе аккумулирует большое число избыточных электронов, которые движутся к угольному электроду.
Fig. 10 gives a drawing of a bulb; the filament will be seen in the centre.	На рис. 10 приводится чертеж электрической лампы; нить накала видна в центре.

в) В английских научно-технических текстах особенно часто встречаются пассивные обороты, тогда как в русском языке страдательный залог употребляется значительно реже.

При переводе, следовательно, мы нередко должны прибегать к замене пассивных конструкций иными средствами выражения, более свойственными русскому языку.

Предложение –

This question was discussed at the conference

можно перевести следующими способами:

Этот вопрос был обсужден на конференции
Этот вопрос обсуждался на конференции.
Этот вопрос обсуждали на конференции.
Конференция обсудила этот вопрос.

г) Авторы английской научно-технической литературы широко используют различные сокращения, которые совершенно неупотребительны в русском языке, например:

d.c. (directcurrent)	*постоянный ток*
a.c. (alternatingcurrent)	*переменный ток*
s.a. (sectionalarea)	*площадь поперечного сечения*
b.p. (boilingpoint)	*точка кипения и др.*

Такие сокращения в переводе должны расшифровываться и даваться полным обозначением.

д) Некоторые слова или выражения в английском тексте содержат чуждый нашему языку образ. При переводе они должны заменяться аналогами, т. е. выражениями соответствующими по смыслу, но более обычными для русского текста, например:

> We have learned to manufacture dozens of construction materials to substitute iron.

Вместо **dozen**дюжина в русском языке обычно в таких случаях употребляется слово *десяток,* поэтому это предложение мы переводим:

> *Мы научились производить десятки строительных материалов, заменяющих железо.*

Задания для самостоятельной работы

1. Какие источники научно-технической информации вы знаете? Приведите примеры научных, научно-технических изданий на русском и иностранных языках по вашему направлению подготовки.

2. Какие типы научного текста вы знаете? Найдите полный описательно-повествовательный и краткий информативно – дескриптивный текст на иностранном языке по своемунаправлению подготовки.

3. Назовите особенности научного текста. Найдите в выбранном вами иноязычном научном тексте характерные синтаксические конструкции.

4. Дайте определение термину.Найдите в выбранном вами иноязычном научном тексте термины, характерные для вашего направления подготовки. Переведите их на русский язык.

5. Каковы источники возникновения английской научно - технической терминологии?

6. Как можноклассифицировать термины по их структуре? Приведите примеры.

7. Расскажите об особенностях перевода научных текстов с иностранного языка на русский.

8. Выберите оригинальный научный текст на иностранном языке объемом 5000 печатных символов с пробелами по своему направлению подготовки и письменно переведите его на русский язык. Укажите выходные данные текста.

9.Выберите оригинальный научный текст на иностранном языке объемом 2000 печатных символов с пробелами по своему направлению подготовки и найдите случаи употребления страдательного залога.

10.В тексте выберите отрывок, обьемом 1500 печатных символов с пробелами и переведите его, используя он-лайн переводчик. Сравните полученные варианты перевода. Были ли переданы стилистические, лексические, синтаксические особенности оригинального текста в выполненных переводах вами и он-лайн переводчиком?

Реферирование иностранного текста

В практической деятельности научных работников, часто возникает необходимость ознакомления с обширными по объему иноязычными материалами, перевод которых занимает много времени. В этом случае прибегают к краткому изложению содержания этих материалов - составлению реферата (summary). Реферат, как экономное средство ознакомления с материалом, отражает его содержание с достаточной полнотой. Реферат не только раскрывает важные стороны содержания, но и показывает читателю, имеет ли для него смысл полностью или частично проштудировать данный источник информации в оригинале.

Составление рефератов (реферирование) представляет собой процесс аналитико-синтетической переработки первичного документа, при котором во вторичном документе - реферате - излагается основное содержание первичного документа, приводятся данные о характере работы, методике и результатах исследования, а также о месте и времени исследования.

Объектом реферирования является преимущественно научная, техническая и производственная литература. На остальные виды публикаций, как правило, составляются только аннотации и библиографические описания.

Различие между аннотацией и рефератом определяется их назначением. Аннотация предназначена только для информации о

существовании первичного документа определенного содержания и характера, а реферат служит для изложения основного содержания первичного документа.

Содержание и структура реферата

Реферат состоит из следующих элементов:

1) заглавия реферата;

2) библиографического описания реферируемого документа;

3) текста реферата.

Заглавием реферата, как правило, служит заглавие реферируемого документа. Если заглавие документа не отражает основного смыслового содержания этого документа, то дается другое, более точное (смысловое) заглавие.

В тексте реферата отражаются следующие данные:

- исследуемая проблема, цель, главная мысль и содержание работы, предмет или цель исследования;
- данные о методике и ее сравнительной точности (при этом широко известные методы не отмечаются);
- выводы автора и указание возможностей и путей практического применения результатов работы;
- ссылка на наличие библиографии и иллюстративного материала (если их нет в библиографическом описании);
- технология, применяемое оборудование и условия проведения исследования;
- таблицы, схемы, графики, формулы, необходимые для уяснения основного содержания документа;
- необходимые справочные данные (об авторе, истории вопроса, месте проведения исследования и т. д.).

В соответствии со спецификой реферируемого документа в реферате могут содержаться не все эти данные, а какая-то их часть.

Реферирование - это сложный, творческий процесс, построенный на проникновении в сущность излагаемого. В процессе реферирования происходит не просто сокращение текста, а существенная переработка содержания, композиции и языка оригинала:

- в содержании выделяется главное и излагается сокращенно, сжато;

- однотипные факты группируются, и им дается обобщенная характеристика;

- цифровые данные систематизируются и обобщаются;

- если основная мысль сформулирована недостаточно четко, она должна быть конкретизирована и выделена в реферате;

- в случае необходимости происходит перемещение временных планов в последовательности от прошлого к будущему;

- язык оригинала претерпевает изменение в сторону нормативности, нейтральности, простоты и лаконичности. Исключаются образные выражения, эпитеты, вводные слова, несущественные определения, обстоятельства, дополнения. Происходит разукрупнение сложных синтаксических конструкций, сокращение количества придаточных предложений, замена их более простыми оборотами.

Информативность как основное содержание жанра реферата как бы "просачивается" через все языковые элементы и их значения и в то же время соединяет их в цельную структуру.

Реферирование - это также сложное комплексное умение, состоящее из целого ряда отдельных элементов.

На протяжении всего курса обучения английскому языку вы выполняли многие упражнения, нацеленные на отработку этих элементов. Это:

1) выделение абзацев, содержащих основную информацию;

2) выделение основных мыслей, фактов, положений;

3) озаглавливание выделенных абзацев;

4) составление плана статьи;

5) сокращение текста;

6) передача содержания текста своими словами (перифраз).

Расчленяя текст на смысловые куски, вы учились анализировать содержание; озаглавливание этих кусков и составление плана учило синтезировать отдельные элементы текста; сокращение текста формировало навык отделять основное от второстепенного; перифраз учил передавать одну и ту же мысль разными средствами.

Написание и композиция научных статей

При написании научных статей авторы обычно пользуются следующими логическими средствами изложения:

- **детализация** - весьма тщательное, всестороннее объяснение понятия;

- **анализ** - деление данного понятия на ряд составных частей и установление между ними соответствующих взаимоотношений;

- **сравнение** - приведение примера из области знакомого для объяснения незнакомого;

- **аналогия** - разновидность сравнения двух разных понятий, имеющих какие-либо общие черты;

- **доказательство от противного**;

- **этимология** - определение при помощи указания на происхождение слова с последующим его описанием;

- **иллюстрации** - таблицы, рисунки, схемы, фото.

Типичная журнальная статья, отвечающая требованиям лаконичного и ясного изложения, без длинных введений и повторений, при строго логической последовательности имеет довольно стабильную композиционную структуру с заранее известным перечнем и содержанием основных ее частей.

Общая схема научной статьи может быть представлена в следующем виде:

1. Заголовок (*Title*).
2. Аннотация (*Abstract*).
3. Введение (*Introduction*).
4. Методикаиматериалы (*Methods and Material; Procedure*).
5. Результаты (*Results*).
6. Обсуждение полученных результатов (*Discussion*).
7. Заключениеирекомендации (*Conclusions and Recommendations).*
8. Выводы (*Summary*).
9. Литература (*References; Literature; Bibliography*).

Все эти компоненты, в свою очередь, объединяются в три логические группы:

- вводную часть (заголовок, аннотация, введение), формулирующую задачу и цель работы;
- основной текст, решающий эту задачу;
- заключение (результаты, обсуждение полученных результатов, рекомендации, выводы), указывающее, в какой степени эта задача решена.

Заголовок отражает информационный объем текста и некоторые аспекты его освещения, мобилизует внимание читателя. Заголовки идут в оглавление, в предметный индекс и другие библиографические издания. Это обстоятельство стандартизирует их форму и размер, существенно влияет на образование определенного круга синтаксических моделей и на выбор специфической общенаучной лексики.

Специфика научных исследований, требующая детального изучения различных проблем, к разработке и описанию которых многократно возвращаются многие авторы на протяжении длительного времени, приводит к образованию устойчивых моделей с постоянной лексикой.

Типичная лексика, встречающаяся в научных статьях	
Название источников	Journal, Magazine, Proceedings, Transactions, Bulletin, Record, Review, News, Archives, Abstracts
Слова, характеризующие категорию самой работы автора, дающие ей название	Studies, Observation, Investigation, Paper, Report, Note, Review, Survey, Comparative Studies, Preliminary Report, Further Investigation, Brief survey
Слова, относящиеся к природе и методике научного исслед6вания	Nature, History, Origin, Method, Problem, Approach, Aspect
Слова, выражающие понятия "значение", "роль", "оценка" элементов исследования	Role, Significance, Value, Estimation

Слова, выражающие взаимоотношение между научными понятиями	Relationship between, Effect on (upon), Influence on (upon).
Слова, относящиеся к понятию свойства	Properties, Characteristics, Characterization
Слова, выражающиедействие, динамику	Action, Dynamics, Mechanism, Function, Reaction, Response

В структуре научного текста усматриваются три основные части: вводная, основной текст и заключительная часть. Такая схема напоминает схему геометрической теоремы, в которой введение соответствует тому, что дано и надо доказать, основной текст соответствует действиям для доказательства, и заключение соответствует тому, что надо было доказать. В соответствии с этим аннотация (*Abstract*) и выводы (*Summary*) обнаруживают много общих черт как по содержанию, так и по выразительным средствам, причем *Summary* выступает в роли своеобразного эха аннотации - *Abstract*.

Если заглавие статьи привлекает внимание читателя лишь поверхностным знакомством с содержанием исследования, то аннотация знакомит его также и с результатами, к которым пришел автор, и с выводом, который он сделал. Аннотация является конденсированной формой самой статьи, представленной в виде абзаца или нескольких абзацев со всеми его структурными элементами, в которых наиболее четко выделяются зачины и концовки.

Заключительная часть статьи (*Summary*) содержит краткие выводы, вытекающие из проделанной работы. Каждый существенный вывод заключен в отдельный абзац или несколько абзацев, имеющих характер самостоятельного тезиса. Абзацы-выводы, как правило, нумеруются.

Синтаксическая связь между такими занумерованными абзацами не только значительно ослаблена, но и обычно вовсе отсутствует. Порядок следования членов предложения стандартный. Преобладает страдательный залог, причем сказуемое отдалено от подлежащего на

значительное расстояние, а нередко оказывается в конце предложения, напоминая тем самым структуру английского предложения. Характерно употребление PresentPerfect. Здесь имеет место полное соответствие нормативной грамматике, согласно которой это глагольное время выражает завершенность, результат действия, т. е. то, что является основной информативной функцией *Summary*. Из типичной лексики выделяются глаголы, выражающие действия, связанные с ходом научных исследований: *hasbeendescribed, hasbeeninvestigated, hasbeenpresented.*

Введение в современных статьях, как правило, не содержит несущественных деталей, длинных исторических обзоров, излишних описаний. Познакомившись с объектом исследований и его значением, читатель тотчас же переключает свой интерес на следующие разделы статьи, в которых ищет ответ на поставленные вопросы.

Поэтому авторы обычно придерживаются строгой логической последовательности в изложении, плавно переходя от одного вопроса к другому. Разрыв в изложении материала, применяемый в художественной литературе в качестве особого приема для возбуждения интереса и заострения внимания читателя, не характерен для научной литературы.

Такие важные вспомогательные элементы текста, как "большой интерес представляет", "как указано выше", "далее рассмотрим" и т. п. не только облегчает автору процесс создания своего труда, но и повышает эффективность его восприятия.

Длявыраженияссылокнаранеесказанноеположениепользуютсясл едующимиштампами: *as has already been **described (mentioned, stated, stressed, emphasized)** или: as has been described **above (earlier, recently).***

ARTICLE 1

Blank Holder Force Control System Driven by Servo-Motor

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Abstract

Blank holder force (BHF) control is used to prevent wrinkles of sheet metal in deep drawing process. Based on a novel conception of BHF control technique driven by servo-motor, a new BHF devicewith six-bar linkage mechanism has been designed and manufactured. Whole control system of the new BHF technique was developed, and the basic structure of the hardware configuration of the system was given. Software analysis, implementation and division of the functional modules have been done. Also, the control software in data acquisition and processing module has been developed in the relevant technology of the BHF control system for the requirements of real-time, stability and accuracy. By the new BHF device combined with the hardware and the software system, the BHF can be regulated accurately variation with the predefined BHF profile in deep drawing process.

1. Introduction

In deep drawing, the blank holder plays a role in regulating the metal flow and when the blank holder forces (BHF) selected properly, it can eliminate wrinkles and delay fracture in the drawn part. When the BHF is small, the sheet metal over the flange area tends to instabilities and wrinkling because of excessive circumferential stress, while tensile stress at dangerous section of the sheet metal will increase and fracture occur due

to too large BHF. Consequently, the BHF is a key parameter during the process, which should be changed with the punch stroke and an optimal relationship between BHF and stoke for a deep drawing process was called reasonable BHF profile generally [1-3]. Numerical simulations, experimental trials and analytical research [1, 4-6] can predict the BHF profile.

Currently, as a result of large transmission ratio and easy to control, hydraulic transmission is used to implement the variable BHF profile control system [7-9]. Be-cause of their size and complexity, slow response time, control accuracy, and high-energy consumption, the hydraulic systems are not suitable for precision, numerical control, flexibility and other requirements in the process of forming. A new conception for the BHF control driven by a servo motor has been proposed [10]. As many advantages such as short transmission chain, simple control system, numerical control, and so on, this new BHF control system should be more effective to regulate the BHF and to improve the quality of forming parts during the process in comparison with the hydraulic system.

In this paper, according to the BHF control technique based on servo motor driven and the requirements for the BHF in deep drawing process, a whole control system, and its hardware and software have been designed. The designed open-CNC BHF control system is flexible and easy to implement, as well as convenient for further development and application. Also, a BHF actuator consisting of some parts has been designed and manufactured. In the open-CNC technology, the computer is a platform of hardware and software of numerical control system, the motion controller is a key component to control the servo motor and the BHF actuator, so that the blank holder would follow certain movement trajectory, to ensure reasonable BHF profile or other predefined one.

2. BHF Device Driven by Servo Motor

The actuator of the BHF control system consists of a ball screw and nut pairs, a six-bar linkage and one blank holder and other parts. In this case, the lead screw, driven by a servomotor passing through a coupling, is supported between two bearings and housings. The servo motor and the housings are fixed rigidly on a framework. The nut is driven by the ball screw and moves in a straight line. Then, the six-bar linkage driven by the

nut passes movement and force to a slide board moving up and down, which is connected to the blank holder by four cushions and four connecting rods. By the six-bar mechanism, the blank holder moves in straight line by variable speed while the nut moves by uniform speed. The relationship between output and in-put displacement of the six-bar linkage designed is shown in Figure 2, where displacement of the nut and position of the slide board stand for input and output respectively. With the six-bar linkage, the blank holder can be quickly down and slow to load and fast return. In other words, uneven transmission ratio characteristics of the six - bar linkage can greatly reduce the rated motor torque. AC servo motor has a strong overload capacity, wide speed range, good acceleration and deceleration performance, frequent starting, braking, reversing switch and other repetitive motion, so that with a certain power of the AC servo motor and reasonable parameters of the BHF actuator, the blank holder can move by following certain rules and the BHF should vary with the punch stroke to meet the requirements of deep drawing process.

3. BHF Control Hardware System

The implementation and validation of control algorithms requires a flexible structure in terms of hardware and cushion   slide   board connecting rod stationary board software. Traditionally, industrial NC systems tasks are generally related to manipulation, which requires only controlling the position of the tools or actuators [11], but in the BHF control, both of the BHF and the position of the blank holder are required.

BHF control system mainly consists of an industrial personal computer (IPC), a motion controller, programmable multi-axis card (PMAC), an AC servo drive and a motor made of Yaskawa, a force sensor, an optical grating, an on-off control, some I/O ports and power units and other components, which is a closed-loop control system.

An IPC-NC hierarchical architecture was used in the BHF system. As an upper computer of the whole system, the IPC is responsible for management, supervision, and control software kernel and background operation.

As a lower computer, the PMAC is a key component of the whole control system, which provides all the real-time instructions for processing and orders the lower control unit simultaneously to cooperate the motion

control. The selected PMAC is a 4-axis motion control card, in which, by using high-speed DSP, the CPU has strong programmable logic controlled (PLC) and motion control functions. In the four axes of the PMAC, one is used for the drive of the servo motor and manipulating the BHF actuator, another is for a position control of the press slider. The remaining two can be reserved for development of the system control, one of which may be used for servo feed mechanism in the future.

There are many application examples using PMAC [12-15], some of them involving in force control [14-15]. In the BHF control system, the blank holder position signals feedback from optical grating and access the motion controller, while the BHFs, analog signals, which are acquired by the BHF sensor, are turned into digital signals by A/D converter and processed by filter-amplifier, and then access to the motion controller as feedback signals, and both of the force signals and the position signals are used to realize real-time detection and closed-loop control.

4. BHF Control Software System

4.1. BHF Control Strategy

According to the characteristics of deep drawing process, a composite mode of position control and force control was used. Shown in Figure 5 , there are two stages in the whole deep drawing process, one of which is idle stroke, at this time the punch of the press moves up or down fast, and the other is effective work stroke(corresponding to AB segment shown in Figure 5), now the punch moves down slowly. The blank holder should moves rapidly and slowly respectively during the idle stroke and the effective work stroke of the punch. When the punch and the blank holder move down, the latter must touch the sheet metal first before the former. During the idle stroke, position manipulating was used in the BHF control system mainly considering time and efficiency requirements, while during the effective work stroke, blank holder force regulating was used in the BHF system because of the requirements of accurate BHF control.

By programming composition of motion control and directly sending commands to the location of the motion controller, through it the commands are transmitted to the drive and the servo motor, and the blank holder force actuator is driven to achieve the movement of the blank

holder, so the position control mode can be realized during idle stroke stage. When the blank holder force sensor detects the signal output is greater than the set value, the control mode is converted from position control to force one. The difference between the BHF detected by the sensor and preset one was input as feedback for closed-loop control.

4.2. Components of the BHF Software System

BHF control software system consists of non-real-time and real-time control modules. The PC is in charge of the non-real-time motion control, such as non-real-time management, easy operation with the man-machine interface, initialization of the entire BHF system, setting the system parameters, non-real-time display, etc.

For example, a communication module, as non-real-time module, play a role of communication between the PC and the PMAC based on the Ethernet technology, by sending online instructions from PComm32 dynamic link library to the PMAC to conduct communication and data exchange to realize the whole control for the system.

Another example of the non-real-time module is human-computer interaction, which has been realized through human-machine interface, and users and the blank holder force control system can exchange information, such as control mode selection, setting of the reasonable BHF profile, speed and location information, displays of the information feedback and working conditions. The users can operate through the software inter-face, and reliable man-machine interface ensure proper use of system, as well as the data and program security.

Human-machine interface software program was developed by VC++ 6.0 in Windows XP environment. Dynamic link library Pcomm32 was called to realize performances of the motion controller, because API functions in Windows XP have no direct access to the motion controller.

For example, in the control program for the realization communication between the motion controller and the host computer, the follow codes were written as *CMainFrame:CMainFrame*.

For real-time control in deep drawing process, the real instantaneous position of the blank holder and the BHF are detected in time and as feedback signals which are compared with predefined values. Then,

adjustment signals of the BHF are sent to the drive, so the mechanical actuators can be driven by the servo motor for the closed-loop control.

The performance of the BHF control system depends mainly on the application and development of the software. As a result, it is necessary to develop the BHF control system software considering its own characteristics.

The performance of the real-time control module of the lower computer mainly includes interpolation, position control, BHF acquisition and control, etc.

The interpolation control and the position control have been encapsulated in the motion control card. This col-lection focuses on the BHF and its control module. The following focuses on acquisition and control of the BHF.

The following is an example of PLC program for data acquisition:
CLOSE; Make sure all buffers are closed DELETE GATHER ; Erase any defined gather buffer OPEN PLC10 ; Open buffer for program entry CLEAR ; Erase existing contents of the buffer P100 = 0 ; Initialization of initial variable P110 = 0 ; Initialization of BHF WHILE (P100 ! < 5); To 5 times if not P110 = P110+ M502; BHF accumulation WHILE (P10 ! < 10); End loop CLOSE; Close Buffer.

In the BHF control module, the current feedback BHF value was compared with the predefined one and their difference was converted into pulse. If the BHF value is less than or greater than the current set one, addition or subtraction of the position command signal and several pulses were sent to control the drive and the motor for-ward or reverse rotates, so the BHF reaches to preset one. The performances of PLC data collection program and the BHF control can be implemented by the PMAC, the control system can achieve real-time response. By time-sharing CPU resources of the PMAC, parallel processing can be done according to the priority of the task.

5. Conclusions

Based on a novel conception of BHF control technique driven by servo -motor, a new BHF control system has been presented. Some key problems about the system, such as system design and composition, mechanical actuator of the BHF, control strategy and mode, real-time and

non-real-time control, and so on, have been investigated. The main results are summarized as follows:

1) A BHF control system driven by servo motor has been designed, which consists of IPC, PMAC, BHF actuator and other hardware components. The blank holder device with a six-bar linkage, a blank holder and other parts has been designed and manufactured.

2) In the BHF system, by using the IPC-NC model, IPC, the host computer for non-real-time control operation and the PMAC, the lower computer for a real-time control, variable blank holder force control can be realized in deep drawing process.

3) According to the characteristics of deep drawing process, a composite mode of position control and force control has been used in the BHF system. The position control and force control were corresponding to the idle stroke and effective work stroke respectively.

4) The BHF software system has been designed by modular method. Many functions of the software system, including non-real-time and real-time modules have been developed. As a result, the proposed system has many advantages such as real-time ability, system stability, control accuracy, easy to operate, and so on, so it can meet the control requirements.

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A Taste of Inequality: Food's Symbolic Value across the Socioeconomic Spectrum

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Abstract: Scholars commonly account for dietary disparities across socioeconomic status (SES) using structural explanations that highlight differences in individuals' wealth, income, or location. These explanations emphasize food's material value. But food also carries symbolic value. This article shows how food's symbolic value helps drive dietary disparities. In-depth interviews with 160 parents and adolescents and 80 hours of observations with four families demonstrate how a family'ssocioeconomic position in part shapes the meanings that parents attach to food. These differing meanings contribute to distinct feeding strategies across the socioeconomic spectrum: whereas low-SES parents use food to buffer against deprivation, high-SES parents provision food to fulfill classed values around health and parenting. The findings suggest that an understanding of how families' material circumstances shape food's symbolic value is critical to fully account for dietary differences across SES.

INEQUALITY manifests in what we eat. Research shows that significant diet dis-parities in the United States follow a socioeconomic gradient (Turrell et al. 2002; Kanjilal et al. 2006; Hanson and Chen 2007; Wang et al. 2014). Scholars commonly trace these disparities to either individual economic attributes that impact individuals' abilities to afford a healthy diet (Darmon and Drewnowski 2008) or to ecological factors that delimit the accessibility of healthy foods (Caspi et al. 2012).

Both explanations rest on the assumption that food's value is solely material.

But food also has significant symbolic value (Bourdieu 1984; DeVault 1991; Cairns and Johnston 2015; DeSoucey 2016; Beagan et al. 2017). A rich scholarship on socioeconomic status (SES) and consumption highlights the ways in which food provides more than mere physical sustenance: what people eat serves critical social, cultural, and emotional functions (Johnston and Baumann 2010; Johnston, Szabo, and Rodney 2011). Fully understanding socioeconomic differences in people's food choices therefore requires answering two related questions: First, how do individuals across the socioeconomic spectrum assign symbolic value to food? Second, how does that symbolic value shape their dietary choices?

I answer these questions using in-depth interviews with 160 parents and adolescents as well as 80 hours of observations with 4 families across the socioeconomic spectrum. I demonstrate how parents' food provisioning practices are in part guided by the symbolic value food provides them and how families 'material conditions shape that symbolic value. "Symbolic value" refers to the symbolic meanings attached to food (May 2011). For low-SES parents, food serves as a symbolic anti-dote to a context of deprivation. Daily life strips low-SES parents of opportunities to meet adolescents' myriad material desires (Pugh 2009). Food can be an important exception: low-SES parents can often oblige adolescents' inexpensive food requests. As a result, low-SES parents use food to compensate for other domains of scarcity, thereby emotionally satisfying adolescents and bolstering parents' own sense of worth as responsible caregivers. Yet meeting these priorities can undermine parents' professed dietary aspirations for their adolescents.

Among high-SES families, food takes on a different-but equally potent symbolic value. Whereas low-SES parents derive feelings of competence by fulfilling adolescents' dietary desires, high-SES parents find a sense of worth as caregivers in curtailing adolescents' dietary wishes that parents deem unhealthy. For high-SES parents, who raise their adolescents in contexts of abundance, food offers an on-going medium for teaching restraint and delayed gratification. High-SES parents therefore regularly deny adolescents' requests for particular foods and drinks, cultivating adolescents' palettes for the "right" foods and signaling to themselves and to others that they are transmitting the "right" values.

For middle-SES parents, who find themselves in a liminal context of neither abundance nor scarcity, food's symbolic value vacillates between its meanings at the two ends of the socioeconomic pole. Middle-SES parents aspire to use food like high-SES parents in an effort to transmit similarly classed values; however, these parents' more limited circumstances mean that they, at times, also use food to compensate for particular types of deprivation. Middle-SES parents' use of food underscores how food's symbolic meaning relates to the material conditions within which parents raise their children.

This understanding of food's symbolic value shows that socioeconomic differences in diet do not result from high-, middle- and low-SES parents' differing valuations of their adolescents' diets or health (Wright, Maher, and Tanner 2015). Most parents across the socioeconomic spectrum hold dietary goals for their adolescents. However, families' material conditions, in addition to positioning them within contexts that impact their abilities to access and afford food for their families, help shape the different meanings that parents attach to food. These differing meanings not only reinforce discourses that highlight parents' personal responsibility- and their failings- for their adolescents' diets, but they also simultaneously obscure the structural inequalities at the root of dietary disparities.

Background
Socioeconomic Status, Families, and Diet
The assertion that socioeconomic status is a "fundamental cause" of diet-related health disparities is supported by a body of epidemiological

research showing that diet quality and diet-related health disparities among adults and adolescents in the United States follow a socioeconomic gradient (Lutfey and Freese 2005; Darmon and Drewnowski 2008; Phelan, Link, and Tehranifar 2010; Kant and Graubard 2013; Wang et al. 2014). Scholarship examining the origins of these disparities highlights important structural determinants of diet, including differential access to healthy food (Caspi et al. 2012; Evans et al. 2015) and the unaffordability of healthy food (Darmon and Drewnowski 2008).

These structural determinants contribute to parents' food provisioning by im-pacting the means available to parents and the strategies they can employ to accom-plish this central caregiving task (Brannen and Nilsen 2005; Gillies 2005; Wills et al. 2011; Daniel 2016). Foundational to a growing body of scholarship on families and food is the finding that parents and adolescents use food for more than physical nourishment. Feeding and eating bestows parents with important emotional benefits (Cairns, Johnston, and MacKendrick 2013), signals status and distinction to others (Johnston and Baumann 2010), allows parents to communicate meaning and care (Gillies 2007), and helps caregivers derive a sense of worth (Tubbs, Roy, and Burton 2005; Lindsay and Maher 2013).

In adolescence, a life stage characterized by increased preferences for and autonomous access to less healthy food choices (Sargent et al. 2002), food is similarly symbolically important. Food offers adolescents a medium for identity formation (Miles, Cliff, and Burr 1998), status signaling (Johnston, Rodney, and Szabo 2012), and in-group belonging (Wills et al. 2009). Adolescents' food preferences and practices are shaped not only by food habits within families but also by external influences, including targeted marketing by the food industry (Gantz et al. 2007; Leibowitz et al. 2012) and peer norms (Stead et al. 2011). With these forces helping to cultivate adolescents' preference for calorie-dense fast foods, parents face new challenges related to their adolescents' diets (Croll, Neumark-Sztainer, and Story 2001).

Research suggests that socioeconomic status underpins how parents navigate these dietary changes associated with adolescence (Eldridge and Murcott 2000; Kaufman and Karpati 2007). Studies have shown variation in the amount of responsibility for and level of control parents report exercising over teenagers' food consumption. Backett-Milburn et al. (2010)

find that whereas low-SES mothers largely view teenagers' food practices as progressively their teenagers' own responsibility and their preferences for junk foods as beyond parental control, middle-SES parents report molding teenagers' food practices, tastes, and manners "in the right direction" as parents' responsibilities. This research underscores how what is consumed within families is not only a product of negotiations between parents and adolescents but that such negotiations simultaneously reflect the socioeconomic conditions within which they take place. The current study advances this line of work by examining how socioeconomic conditions shape the meanings that parents attach to adolescents' food requests.

Parenting, Feeding, and Health

Although food provisioning is a key component of caregiving across the socioeco-nomic spectrum, parents' food provisioning strategies are in part shaped by the increasingly widespread discourses that place the bulk of responsibility on par-ents to feed their adolescents in ways that ensure their current and future health (Brenton 2011; Kinser 2017). These normative expectations are part and parcel of an increasingly prevalent intensive mothering ideology, or the widespread expectation that mothers should spend extensive time and energy cultivating children and tendingtotheirneeds(Hayes1998).Asthestakesaroundfeedinghavebeenraised, mothershavecometobelargelyviewedaspersonallyresponsibleforfeedingtheir children "healthy" food and protecting them against "unhealthy" influences (Cook 2009;Zivkovicetal.2010;Cairnsetal.2013).Researchshowsthatmanymothers feel that they fall short of such ideals, with some even seeing the flaws inherent in these discourses. At the same time, many mothers still feel accountable to the normative demands of intensive motherhood, particularly as they relate to food provisioning (Romagnoli and Wall2012).

Amidst these prevailing discourses and exceedingly high expectations for parenting, feeding, and eating, I ask: how do parents of differing   socioeconomic circumstancesapproachtheiradolescents'diets?Buildingonpriorresearchde monstratingthecentralroleoffoodforparentsofdifferingsocioeconomiccircu mstances

(DeVault1991;LindsayandMaher2013;Bowen,Elliott,andBrenton2014;Cairns andJohnston2015),Ishowhowfood'ssymbolicvaluetoparentsisinpartderived from their material circumstances and contributes to their provisioning strategies and adolescents'consumption.

Data and Methods
Data Collection

This study draws on qualitative data that I collected in two research phases in the San Francisco Bay Area. Phase one involved 160 interviews within 74 families withadolescentsacrosssocioeconomicstatus(24low-SES,24middle-SES,and25 high-SESfamilies).IconductedallinterviewsbetweenJanuary2015andMay2016. Inclusion criteria for families included having a child between the ages of 12 and 19 who lived at home. I categorized families by SES using a composite measure of educationandincome(Cooper2014).[1]Familieswerehigh-SESifatleastoneparent hadacollegeeducationandfamilyincomewasabove350percentoftheCalifornia poverty line. In most middle-SES families, both parents had at least a high school education and household income was between 180 to 350 percent of the poverty line. Most middle-SES parents had some form of additional education, typically a vocational or associate's degree. All low-SES families were below 180 percent of the poverty line and neither parent had more than a high school degree. Most low-SES families received public assistance.

Within each socioeconomic group, I included comparable numbers of families from different ethnoracial backgrounds (white, black, Hispanic, Asian), parental composition(single-parentandtwo-parenthouseholds),occupationalstatus(dual- and single-income households), and immigrant status (native- and foreign-born parents).[2]Incorporating this intrasocioeconomic variation enabled an exploration ofhowthesecharacteristicsinteractedwithsocioeconomicstatustoshapeparents' foodprovisioning.

I recruited families primarily using purposive sampling (Small 2009). At the time of recruitment, families were told that they would be participating in a study about families and food that involved interviews with parents and adolescents. Although self-selection into the study is an inherent limitation of this project, I sought to ensure diversity among participants through targeting different channels of recruitment and by recruiting through both parents and adolescents (Jiménez 2017). I recruited one-third of families through a public high school (Hillview Central) where teachers, coaches, administrators, and parents connected me to parents and adolescents.[3] I recruited the other two-thirds of the sample throughout the Bay Area. I approached low-SES parents at food banks, toy drives, and shopping outlets. I identified middle- and high-SES parents and adolescents through professional email lists, flyers, and personal contacts. I used snowball sampling, capping referrals at two in order to stretch the socioeconomic and ethnoracial range of the sample. I paid families $60 in cash for participating.

Within each family, I conducted separate, private one to two hour interviews with at least one parent and one adolescent to examine how both parents and adolescents independently and interactively shaped family diet.[4] I developed, tested, and refined the interview guides in November and December 2014 before beginning formal data collection in January 2015. Interviews with parents were semistructured, with questions about grocery shopping, meal patterns, food provisioning priorities and challenges, and their adolescent's role in shaping family diet. I always interviewed the primary caregiver, which for most families was the mother ($N = 69$), though I also interviewed fathers ($N=15$). Interviews with adolescents ($N=76$) involved questions identical to parent interviews in addition to adolescents' perceptions of family diet and independent food choices. The online supplement contains parent and adolescent interview protocols.

I sought to lessen the influence of social desirability on parents' and adolescents' responses by conducting interviews in private and using open-ended questions that allowed respondents to guide the conversation and discuss topics most salient to them. I framed the study as being about "food" rather than about "health" and did not mention terms such as "healthy" or "unhealthy" during the interview before respondents brought these terms up themselves. In addition, interviewing multiple members of each family allowed me to triangulate and verify data offered by each respondent. All interviews were transcribed verbatim and anonymized. I took field notes during all interviews and wrote interview summaries to enable reference to the entire sample during analysis.

Phase two of data collection involved ethnographic observations of 4 families (2 low-SES, 1 middle-SES, and 1 high-SES) with whom I had previously conducted interviews. I selected families based on their socioeconomic background and differing food-provisioning strategies. I conducted 15 to 22 hours of observations with each family over two months. To address social desirability, I informed families at the outset of observations (with institutional review board approval) that I was interested in observing various aspects of family life while not emphasizing food. Families were thus less specifically attuned to observations of their food practices. Following their participation in the study, I explained to them that food had been a primary focus. No families complained upon learning this; to the contrary, all four echoed the centrality of food to family life.

Observations typically lasted three to four hours at a time, and writing field notes required 8 to 10 hours for each period of observation. I observed families at home as well as during diverse outings, accompanying them on trips to super- markets, birthday parties, church services, nail salons, and back-to-school nights. In addition to observing mealtimes, my observations also captured less formal eating occasions, such as quick trips to the drive-through or breakfasts on the go. Importantly, spending multiple hours with families allowed me to collect data on family members' exchanges around food, including discussions, arguments, and negotiations. I observed parents interacting with each other and with adolescents as well as adolescents engaging with their

siblings and peers. Consistent with the experiences of other family ethnographers, the more hours I observed, the less my presence seemed to influence family members' behaviors (Lareau 2003; Cooper 2014). Families fought, argued, played, gossiped, and went about their daily lives withlittleregardformypresence.Ipaideachfamily$300incashattheendoftheir participation.

Data Analysis

I analyzed interview and observational data using qualitative content analysis, an inductive, dynamic form of analysis that is oriented toward understanding both themanifestandlatentcontentofinterviewdata(GraneheimandLundman2004). Overall, I engaged in five rounds of coding, the first following the completion of the interviews and the next four rounds of coding following the completion of the familyobservations.

First, an initial open coding of the interview data suggested similarity in how parents valued adolescents' diets and dietary health but variation in how they provisionedfood.Ithereforedevelopedacodingschemethatcapturedparents'a spirationsfortheiradolescents'dietsaswellasfood-relatedchallengesthatparents faced with their adolescent, including whether their adolescent requested "un-healthy"foodsandhowparentsrespondedtotheserequests.Thissecondroundof focusedcoding(Charmaz2006)revealedthatadolescentsacrossfamiliesrequested foodsthatparentsdidnotwantthemtoconsume;however,parentsdifferedinho w they responded to such requests. These different approaches were patterned by parents'SES,withmosthigh-SESandsomemiddle-SESparentsdecliningrequests andmostlow-SESparentsobligingthem.Throughrereadingandrecodingthetranscripts,Iana lyzedifsuchrequestsrelatedtodifferencesinparents'accountsoffood access,affordability,ornutritionalbeliefs.Thesefactorsdidnotadequatelyexpl ain thedifferentapproaches,butthisroundofcodingfacilitatedthegenerationofahy pothesis that what food meant to parents in part shaped their responses to

their adolescents' food requests. In a fourth round of coding, I identified passages where parents discussed what food meant to them and how they used food, particularly with their adolescents. I used the coded passages to generate different subcategories of symbolic value. I then conducted a fifth round of focused coding to sort all pas- sages that captured these subcategories. Next, I collapsed these coding categories into two primary forms of symbolic value: "compensatory" and "disciplinary."

I mapped the different values and corresponding provisioning approaches onto familial characteristics to ascertain along which dimensions food's symbolic value varied, engaging with existing theory and empirical research - primarily within the fields of the sociology of consumption, family, and health - to contextualize this variation.

The major axis of differentiation for food's symbolic value was socioeconomic status. However, as expected, parents' symbolic ascriptions to food did not always perfectly correlate with their SES. Whereas high- and low-SES families' approaches largely diverged, the heterogeneity of the middle-SES sample meant that food's symbolic value shifted between and even within these families. I highlight these shifting meanings as well as inter- and intrafamily nuances in the Findings section on middle-SES families. Another important point of variation was between mothers and fathers, consistent with scholarship underscoring the importance of food work to motherhood and a core part of maternal labor and identity (DeVault 1991; Cairns et al. 2013). I attend to this variation in the Findings section examining high-SES families. That differences across race or ethnicity did not emerge supports the explanation that it is families' material circumstances, rather than ethnic or cultural origins, that primarily drive food's varying symbolic meanings to parents.

I analyzed the 160 parent and adolescent interviews to descriptively map out and categorize food's symbolic value across my sample. However,

given this article's focus on food's symbolic value to parents, I draw exclusively from the 84 parent interviewsand80hoursoffamilyobservationsintheFindingssection.Adolescent interviews were critical to understanding the nature of adolescents' requests and parents' strategies, but parents' reports elucidated the meanings that caregivers attachedtofood. Finally,itisimportanttonotethatparentsandadolescentsinthis study freely used the terms "healthy" and "unhealthy" when discussing food. This isconsistentwithotherstudiesoffamilydiet(ChapmanandBeagan2003;Beagan et al. 2017). Rather than assuming or imposing my own definitions of these and relatedconceptsonthedata,Iusedinterviewsandobservationstoletrespondents discussanddefinetheseconceptsintheirownterms.Thus,theuseofsuchtermsin theFindingssectionreflectsparents'perspectivesandunderstandingsratherthan offering an objective measure of healthy or unhealthyfood.

<u>Findings</u>
<u>Parents' Food Provisioning Ideals across the Socioeconomic Spectrum</u>

Across the socioeconomic spectrum, most parents cared about their adolescents'diets and dietary health. Many parents mentioned both the general importanceof healthy eating as well as efforts to ensure their adolescent consumed a healthydiet. This highlights the increasing prevalence of discourses about diet and healthin addition to parents' internalized feelings of responsibility for their adolescents'diets. Most interview respondents freely and casually used the terms "healthy" and"unhealthy" throughout interviews. When asked at the end of the interview whatthey meant by these terms, almost all parents—regardless of SES, race, or gender—talked about healthy and unhealthy eating in a similar manner, revealing theascendancy of what can be considered a "mainstream" or dominant healthy eatingdiscourse (Ristovski-Slijepceniv, Chapman, and Beagan 2008; Beagan et al. 2017).

Vegetables, fruits, whole grains, fish, and lean meats were commonly described as"healthy," and some parents' definitions also encapsulated the importance of fresh,homemade, or whole foods. In contrast, unhealthy

eating was generally agreed toinvolve "junk foods," including soda, candy, chips, and fast food, as well as foodshigh in fat, salt or sugar.

Shared understandings of eating healthy were accompanied by parents' sharedbeliefs that adolescents should eat a healthy diet: 90 percent of high-SES parents,

85 percent of middle-SES parents, and 70 percent of low-SES parents noted theimportance of a healthy diet for their adolescent's current and/or future health.

As Skylar Gonzales Sullivan, a high-SES Hispanic mother, explained, "food is aninvestment in our long-term overall health." Similarly, Miranda Kirk, a low-SESwhite mother, emphasized the link between diet and health:You are what you eat. Food is your medicine. As a mom, you tell themas much as you possibly can throughout their life. Your health depends on what you put into your body. Period.Despite these similar beliefs, parents differed across the socioeconomic spectrumin their provisioning approaches. Public health scholarship suggests that these

SES-based differences should be largely (if not entirely) explained by differences ingeographic and financial access to healthy foods (Drewnowski and Specter 2004;Caspi et al. 2012). Yet within this sample, neither access nor affordability could fullyaccount for the differences between families. Most of the families in my sample did not reside in food deserts.5Families reported similar food access: 72 out of 74families lived within two miles of a supermarket, and all but two families had a carthat they used regularly. The remaining two families lived within half a mile of grocery store. Moreover, all of the parents in my sample reported having access toan affordable supermarket nearby. Of the myriad challenges and constraints thatparents reported relating to their adolescents' diet, food access was not one of them.

Thus, although food access is undoubtedly an issue for other populations (Gordonet al. 2011), it cannot fully account for differences within this sample.

Affordability offers a more promising explanation of dietary differences. Financesemerged as a meaningful topic in interviews with parents across the socioeconomicspectrum. Although high- and middle-SES parents reported being costconscious, most stated that food quality and healthiness were stronger considerationsdirecting their food purchases.

In contrast, consistent with prior research,low-SES parents more often reported cost as the guiding factor in their food purchases(Wright et al. 2015; Daniel 2016).

In addition to cost concerns, parents vocalized another important consideration:adolescents' own preferences. Parents across the socioeconomic spectrum reportedthat they faced pressures from their adolescents to buy certain foods, many of whichthey viewed as unhealthy. Parents reported differentially navigating these pressures.

Among low-SES parents, 52percent said that they only denied their adolescents' food requests if they lacked the money. When funds were available, low-SES parents reported buying the food theiradolescents requested. Many low-SES parents also explained that, even when fundswere tight, they strove to meet their adolescents' requests: 35 percent of low-SES

parents said that they always bought what their adolescents asked for, even whenthose requests guided them away from cheaper, healthier food options.

That high-SES parents consistently denied adolescents foods they could easilyafford whereas low-SES parents stretched their dollars to meet these requestshighlights the varying meanings that parents attach to food across the socioeconomicspectrum. In the following three sections, I show how parents' differentialnavigation of adolescents' requests is reflective of food's symbolic value across thesocioeconomic spectrum. To do so, I present three families-one high SES, onemiddle SES, and one low SES—from this study's observational phase. With eachcase, I draw heavily from interviews with parents to demonstrate the prevalence ofeach approach within their socioeconomic group.

Low-SES Parenting and Food Provisioning

Nyah Baker was a low-SES black single mother of two adolescent daughters, Mariahand Natasha. Nyah, who did not graduate from high school, provided for herfamily over the years by working various minimum-wage jobs. Similar to mostlow-SES families in this study, Nyah's financial situation was precarious. WhenI first met Nyah, she had most recently been employed cleaning college dormsuntil health troubles prompted her doctor to recommend a year's leave from work.

Nyah was supposed to receive monthly disability payments, but four months intounemployment, she had yet to see any deposits into her bank account.At the time of observations, Nyah's monthly income consisted of approximately$190 in food stamps and $200 in social security payments for her daughters' learningdisabilities. To make ends meet, Nyah relied on the little money she had savedwhile working and the income that her boyfriend brought in through his informal employment as a neighborhood mechanic. Although Nyah could usually meet hersubsidized rent, she was sometimes unable to consistently pay all her bills. Duringthe time I spent with the Bakers, I observed the cancellation of both Nyah's cell

phone plan and her cable service due to outstanding payments.

These tenuous financial circumstances shaped Nyah's daily life, including herapproach to food provisioning. Like other low-SES parents in this study, Nyahdescribed aspects of her family's diet as "unhealthy," explaining as follows:

I think we're eating way unhealthy because of a lot of the snacks. Ofcourse I know that's junk food. I'ma keep it real. I buy a lot of junkfood. Snacks like donuts, Nutty Buddies, the popcorn and stuff like that:

chips, sodas. We always buy Hot Pockets, corn dogs. . .

Yet Nyah also believed that diet was vitally important for her and her adolescents'health. She told me, "I know we need to start eating healthy. What looks goodand tastes good is not always good for you. I know that. I know that." Nyahfrequently commented on the importance of a healthy diet, including one afternoon,when Nyah, Mariah, and I drove to the pawnshop to exchange Nyah's jewelry forcash. As Mariah sat in the front seat eating Fruity Pebbles out of the box, Nyahcommented: "if you eat well, you're going to live long, that's for sure." Yet amidstconcerted efforts to stay afloat, the healthiness of her daughters' diets did not alwaysfeel like the most pressing concern to Nyah.

What was often more salient to Nyah was the awareness that she had very

limited means through which to give Mariah and Natasha what they wanted.

Nowhere was this limitation clearer than when Natasha and Mariah were on

summer break. Nyah's financial circumstances during this period challenged herabilities to keep her daughters safe and happy when funds to take the girls onvacation or enroll them in activities were scarce. Nyah did her best. One evening atsummer's outset, she explained to her daughters that despite all that they lacked,there was still a great deal to be thankful for:I told them it's not all about fancy clothes and fancy cars. Be happy youhave a roof over your head, you have food in here, you can watch TVwhen you want to and use the bathroom whenever you want to. Youhave a fan inside to go to when you get hot and a blanket to get underwhen you're cold. . .

As Nyah recounted this story to me, she paused momentarily before concluding:"I'm just trying to survive."

A key component of Nyah's survival involved consistently denying her adolescents'requests for indulgences. Within this context of ongoing refusals of larger purchases and investments-such as enrollment in sports camps and arts programs- Nyah found that food offered a chance to say "yes" to her adolescents. Thus, Nyahand other low-SES parents aspired to grant their adolescents' food requests often.

On a trip to the grocery store, when Natasha asked Nyah for a bag of Doritos for$0.99, Nyah could say yes. When Mariah requested a Dr. Pepper for $1.50, Nyahcould oblige. In the afternoon, when the ice cream truck rolled around, Nyah routinelygave her daughters $2 to spend on treats. These actions occurred alongsideNyah's frequent remarks to me that she should encourage her daughters to makeother dietary choices. However, food offered Nyah an accessible and relativelyinexpensive way to satisfy her daughters wants and get through each day. "It makesthem happy," Nyah explained.

Low-SES parents' honoring of their adolescents' dietary requests not only servedto compensate for broader material deprivation; meeting these requests also helpedparents to derive a sense of worth as competent caregivers. So important were thesepriorities that low-SES parents explained that meeting their adolescents' requestscould lead these parents away from the most affordable food choices. Faye Bautista,a low-SES Filipina mother, recounted that she spent around $35 on take-out anddelivery every day because it is what her 16-year-old daughter Melanie preferred.

"We spend a lot of money for food," Faye lamented. "Whatever Melanie wants." Theprioritization of adolescents' preferences was similarly on display one afternoon when I accompanied Nyah and Mariah on a trip to Starbucks. After paying the$10.80 tab for their frappucinos, Nyah spent $25 getting their eyebrows waxed at anearby salon. With the financial hardship Nyah faced, that money could certainlyhave gone elsewhere: toward turning the cable back on or addressing longstandinghousehold repairs. But Nyah put these expenses on the backburner in order toprovide for her daughter's wants.

Many low-SES parents spoke about spending their last pennies to take their adolescentsout to their favorite eating establishments, highlighting that they wantedtheir adolescents to feel that their preferences were heard and mattered. MirandaKirk, a low-SES white mother who struggled to pay rent most months, noted shewould still do anything to give her adolescent daughters the food they want: The way I feel about food is, like, if they need food and they're hungry,then I'm gonna buy it. I don't care how much money is in my pocket.

I'll spend my last $20. That's how it is. It'll come. Sometimes it's hard.Everything, literally every dime I get goes to food. Every dime. Butwhat do you do? I just buy it for them. It's for my babies. I love themmore than anything on the planet. I don't care. They want it. They'llget it. One day, they'll know. They know I love them and that's all thatmatters. So what? It's food. I don't care. If she wants a $2 candy bar, Iget it for her if I have it.

For Miranda, food not only offered an important means of showing love and care toher daughters; she also saw her ability to get her daughters the food they wanted asimportant evidence that she was a responsible provider. Similarly, Delfina Carrillo,a low-SES Hispanic single mother who worked as a supermarket cashier, explainedthat her son's dinner typically came from whichever fast food restaurant he selectedon a given night. Although Delfina was aware that she could save money bycooking dinner, her priority was her son's happiness:

"As long as my son eats, I'm happy. I always make sure that there'ssomething that he likes so he'll eat. I guess the most important thing issomething he likes so he will eat. Being able to meet these requests allowed Delfina and other low-SES parents toaffirm their adolescents and

give them a sense of dignity in a context where dailylife challenged that ability. Delfina, like other low-SES parents, even noted thatsometimes she would eat something inexpensive or smaller for dinner, such as acan of soup, so that she could provide her son with food that he wanted.Interview after interview with low-SES parents highlighted how, in a contextof scarcity, responsible parenting meant honoring adolescents' preferences. Somemothers gave accounts like Elissa Garcia, a low-SES Hispanic single mother who didnot take for granted the ability to oblige her adolescents' food wishes. Elissa recalledan earlier time when she found herself in even direr financial situation. "I hadbarely enough to pay the bills and not much to pay for food," she recounted. Thosetimes required Elissa to say no to even the most inexpensive of her adolescents'food requests. Although at the time of the interview, Elissa still lived below thepoverty line, she generally had enough money to offer her adolescents foods thatthey enjoyed. When there were extra funds-when Elissa worked overtime or encountered a supermarket sale-her first priority was getting her adolescents whatthey wanted:They'll be like, 'Can I get some Hot Pockets, Mom?' Or 'Can I get somepizza bites?' [. . .] Or 'Can you get me a soda?' I think they pretty muchhave all the say they want [. . .] I want them to feel comfortable withwhat they're eating.

Although Elissa also explained that she did not want her adolescents eating thosefoods regularly, that consideration was outweighed by a much more pressingconsideration. For Elissa, being a good parent meant being able to give adolescentsnot only enough but also some of what they wanted.

Finally, food's symbolic value was evidenced in how Nyah and Dana, the otherlow-SES mother I observed, spent the $300 they received for participating in thisstudy's observations: both mothers divided the payment equally between themand their adolescents. Nyah gave each of her two daughters $100, all of which theyspent within two weeks on candy, fast food, and clothes.

Nyah used $60 to pay theelectricity bill and $20 to purchase gas. With the remaining $20, she bought beerand chips. Dana spent her money similarly, giving her two daughters each $100and spending her $100 on a haircut. For Nyah and Dana, a windfall of cash did notresult in an increase in fruit and vegetable consumption, as some scholars wouldsuggest.

Rather, this payment offered these low-SES mothers an opportunity to giveadolescents what they wanted in a context when such opportunities were relatively

scarce (Pugh 2004).

Although low-SES parents in this study valued their adolescents' diets and

health, their food provisioning approaches were shaped in part by the meaning thatfood held in a context of severe financial constraints. Amidst limited chances tomeet their adolescents' larger desires, accommodating their adolescents' relativelysmaller wishes (for instance, for food) was usually still attainable. The situation wasdifferent for high-SES parents. Next, I show how these parents' greater resourcesaltered food's symbolic value and their navigation of adolescents' requests.

Discussion and Conclusions

Thisarticlehighlightsanimportantmechanismshapingparents'foodpro visioning across socioeconomic status: food's symbolic value. This symbolic value is forged in part through broader structural inequalities that configure the contexts within which parents raise and provide foradolescents.

Ifindthatsocioeconomicstatusshapesthemeaningsthatparentsattachtof ood, andthosemeaningshelpshapehowparentsapproachtheiradolescents'diets.Fo r low-SES parents, food is a symbolic antidote to a context of deprivation. Under the structural constraints and stresses of poverty, low-SES parents use food to compensate for other realms of scarcity. Doing so not only serves to emotionally satisfyadolescents,butitalsobolstersparents'ownsenseofworthandcompeten ce as caregivers. In contrast, among high-SES families, food assumes a distinct but equally powerful symbolic function. For high-SES parents, food offers a medium forfulfillingdifferentidealsofresponsibleparenting.Theseidealsinvolvefoste ring a particular set of values around self-restraint and health, all the while cultivating adolescents'palettesforacceptablefoods. Usingfoodthiswayalsoallowshigh-SES

parentstofeelandsignaltoothersthattheyaresuccessful,investedcaregivers.For middle-SES parents, who parent in a precarious space of neither abundance nor scarcity,food'ssymbolicvaluevacillatesbetweenitsmeaningatthetwoendsofthe socioeconomic pole. Middle-SES parents aspire to use food like high-SES parents in order effort to transmit similar values; however, these parents' more limited circumstances mean that they can also use food as a compensatorytool.

These findings are consistent with research showing that socioeconomic status underpins how parents navigate the dietary changes associated with adolescence (Eldridge and Murcott 2000; Kaufman and Karpati 2007). As adolescents become increasingly independent and subject to external influences that encourage augmentedpreferencesforlesshealthy,calorie-densefoods,scholarshavedocumented variationintheamountofresponsibilityforandlevelofcontrolparentsreportexercising over their teenagers' food consumption. Low-SES parents largely exercise less control whereas middle-SES parents report more feelings of responsibility in continuing to shape teenagers' food practices (Backett-Milburn et al. 2010). This study's findings suggest that these different approaches may, in part, be mediated by food's symbolic value to parents. The low-SES parents in my study, although theydonotviewtheiradolescents'preferencesashealthy,respectthesepreferences andlargelyseektohonorthemratherthanchangethem,evenwhendoingsomeans more spending more. In contrast, many high-SES parents struggle to accept their adolescents' unhealthy preferences; their denial of these preferences and attempts tofosterdifferentpreferencesunderscorethemeaningstheyattachtothefoodtheir adolescents eat.

Relatedly, these findings importantly show that low-SES parents strive to meet theiradolescents'foodrequests*not*becausetheysubscribetoa"cultureofpoverty" (Lewis1961)thatdevaluestheiradolescents'dietsandhealthorbecausetheyare less

knowledgeableorcompetentatfoodprovisioning(Wrightetal.2015).Rather,Ifind that although parents across the socioeconomic spectrum value their adolescents' diets,theirdivergingmaterialcircumstancesshapefacetsoftheirfoodprovisioningapproaches.

Most mothers in this study subscribe to widespread discourses that frame their adolescents' diets and health as their responsibility (Brenton 2011; Kinser2017)andattempttomeetthesenormativeexpectations. Low-SESmothers' provisioning strategies stem not from a disregard for their adolescents' diets or health;completelytothecontrary,theseparents'approachesreflectadeepdesire to care and provide for adolescents amidst constrained material circumstances. This finding adds to mounting scholarship showing that differences in values do not fullyexplaintheconnectionbetweensocioeconomicstatusandparentingbehaviors (Dohan2003;Carter2005;EdinandKefalas2005;Wilson2009;Small,Hardin, and Lamont 2010; Lee and Zhou 2015).

That poverty not only deprives low-SES parents of financial resources but also shapes the meanings that become attached to food provisioning has important implications for understandings of dietary disparities. Whereas high-SES parents provision in an environment of abundance, security, and stability, low-SES parents do so in the face of scarcity, uncertainty, and instability (Sanchez-Jankowski 2008).Comparedtohigh-SESparents'wealthofopportunitiestoprovidefortheir adolescents and bestow unto them advantages like stable housing, schooling, and extracurricular activities, low-SES parents struggle to provide within severe re-sourceconstraints(EdinandLein1997;ChinandPhillips2004;Tubbsetal.2005; Pugh2009;Beatty2010;Desmond2016).Althoughnotthecasewithinthisstudy's sample, low-SES families in many regions live in neighborhoods that grant them limitedaccesstoaffordable,healthyfoods(Gordonetal.2011)orthatinundatepa

rentsandadolescentswithcheaper,fastfoods(Kwateetal.2009).Beyondremedying spatialinequalities,policiesaimedatdurablybetteringfamilies'financialstates may be most effective in reducing dietary disparities. Providing low-SES families with economic stability and security—at best elevating them out of poverty—would allowparentstomeetmoreoftheiradolescents'needsandwants,therebydecreasing the symbolic value of food to compensate for deprivation in otherdomains.

This study has limitations. First, food's symbolic value to parents and parents' food provisioning strategies may differ geographically. Future research should explore the generalizability of this study's findings to other regions. Second, al- thoughthisstudyfocusedprimarilyonparent–adolescentinteractions,adolescents and parents are embedded in various environments, including neighborhoods, workplaces,andschools.Tounderstandfood'ssymbolicmeaningwithin families,scholarsshouldexaminehowparent–adolescentinteractionsaroundfood areshapedbytheseembeddingsaswellasbyexternalinfluencessuchasthemedia and marketing from food and beverage industries. Finally, the cross-sectional natureofthesedataprecludemefromassessingthecausalimpactsoffood'ssymbolic valuetoparentsandtheirfoodprovisioningonadolescents'dietsordietaryhealth. I hope that future research will assess the long-term implications of the processes this study identified on adolescents' dietary and diet-related healthoutcomes.

In addition to its scholarly contributions, this study implicates societal evaluationsofparentingstrategiesacrossthesocioeconomicspectrum.Adolescents'diets anddiet-relatedhealthoutcomesareoftenframedthroughtheparadigmsoffailure and blame of the parents (Zivkovic et al. 2010; Brenton 2011). For the public, the imageofaparentbuyingtheirchildasodainvokesjudgmentanddisapproval.

Yet viewing parents as solely responsible for adolescents' diets incorrectly places the consequences of systemic inequalities on the backs

of caregivers. In doing so, theseparadigmsobscurethemyriadstructuralinequitiesthatshapetheconditions within which parents make daily choices. In order to address dietary disparities, scholars, policymakers, and practitioners alike must acknowledge and address the consequencesofsocioeconomicconditionsforparents'provisioningstrategies and adolescents' consumption.

Notes

1. Inthreehigh-andtwomiddle-SESfamilies,Iwasunabletoobtainorcloselyapproximate household income data. In these instances, I categorized families according to parents' levels ofeducation.

2. Whenparentswereofdifferentethno racialbackgrounds,Icategorizedthefamilyonthe basis of the race and/or ethnicity of the primary caregiver or food provider. I use the term "Asian" to refer to South, Southeast, and EastAsians.

3. All names of institutions, organizations, and individuals have been changed to protect anonymity.

4. In 67 of 74 families, I conducted an interview with at least one parent and at least one adolescent. When possible, I interviewed more than one parent and more than one adolescent.In4families,Iconductedaninterviewwithoneparent(andnoadolescents). In 3 families, I conducted an interview with one adolescent (and noparents).

5. To determine whether a family resided in a "food desert," I used the US Department of Agriculture's online Food Desert Locator. This allowed me to identify whether their home address fell within a neighborhood federally defined as a fooddesert.

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ARTICLE 3

Towards sustainable waste management in the Baltic

Abstract: At present, the Baltic Sea region (BSR) possesses great disparities inthe methods used to handle and process waste. While some countries recovermost of the waste they produce, a number of other nations are lagging behind.

Such disparity needs to be addressed to accommodate a more sustainable solution to waste management issues. The paper discusses how universities together with other research institutions find their prominent role here. A regional project 'RECO Baltic 21-Tech' (partly funded by Baltic Sea Region Program 2007–2013) serves as an example of mutual benefits: universities via professional research and education contribute to a sustainable waste management in the region, at the same time gaining interesting topics for research, possibilities for capacity building and curricula enrichment for students.

Towards sustainable waste management in the Baltic Sea region countries

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This paper is a revised and expanded version of a paper entitled 'Towardssustainable waste management in the Baltic sea region countries: thecontribution of universities' presented at the *6th International Conference onEngineering Education for Sustainable Development EESD13*, Cambridge, UK,

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1. Introduction

Science is aimed at generating true knowledge; engineering is about changing the world (Staniškis and Stasiškienė, 2006). Although this is a simplification, as technology in itself is a determinant of changes in the world and a determinant of institutional change (change in the formal rules of the game (North, 1990), the role of technology deserves a firm position in shaping our lives. It is therefore especially important that engineers aretaught to respond to and to deal with the problems of society.

Waste treatment and management is one of the crucial problems of modern society.

The increasing economic prosperity in the European Union is accompanied with higher consumption levels and consequently – a growing amount of post-consumer waste.

Today, the EU generates more than 252 million tonnes of municipal waste annually (Eurostat, 2013b). However, the rate of waste generation per capita differs significantly between countries. There also exist differences in the level of waste management systems: in some

countries, most of municipal waste still goes to landfills, while in other countries recover materials or energy from most of the generated waste (EEA, 2013).

Improved waste management and waste prevention is therefore perceived as an important step towards sustainable development, and engineers have to be taught to deal with this issue.

Universities across Europe, and regionally the Baltic states, may have a variety ofdissimilar methods to teach these issues. The purpose of the current paper is to analysehow universities contribute to attempts to achieve a sustainable waste managementin countries around the Baltic Sea, when collaborating in a regional project. It was soughtto understand the advantages and limitations of including regional aspects into the twotraditional university functions – research and education.

2. Waste management in the Baltic Sea region

The Baltic Sea drainage area includes ten countries, which have significant disparitiesbetween the levels of municipal waste management (Filho et al., 2014). Looking at themain characteristics of municipal waste management sectors, the countries can beclustered into three groups. The region can be schematically seen in Figure 1.

The first group of countries, i.e., Sweden, Finland, Denmark and Germany, are 'old' EUMember States with high gross domestic product (GDP) (Table 1) and establishedinstitutional set-ups. These countries can be classified as having well-developed wastemanagement infrastructures with very little landfilling (<5% of waste landfilled inGermany, Denmark and Sweden, ~40% in Finland), as well as high rates of separate

waste collection and recycling (Figure 2) (BiPRO, 2012; EEA, 2013).

Compared withother countries in the region, these countries also generate a high volume of municipalwaste. Denmark, with 718 kg per person, had the highest amount of waste generated in2011, followed by Germany, Finland and Sweden with values between roughly 600 kgand 450 kg per person (Eurostat, 2013a; Table 1). This first group of countries has a goodlevel of organization and adequate financing schemes from mostly national(public or private) sources (RECO, 2012c).

Another group – Estonia, Latvia, Lithuania and Poland – are new EU members, withGDP rates typically half of the EU average. The amount of municipal waste generated ismuch less than in the first group

of countries (reported as below 450 kg/person/year in2011 by Eurostat, 2013a). Municipal waste infrastructures and institutions are currentlyunder development (BiPRO, 2012). While municipal waste recycling rates are steadilyincreasing, the majority of waste is still landfilled and the quality of waste separation andrecycling efficiency remains generally low (Figure 2). A great challenge is biodegradablewaste management; separate collection from households is virtually non-existent and theinfrastructure for aerobic and especially anaerobic treatment is currently underdeveloped(BiPRO, 2012). The countries are also experiencing shortcomings in the public financingof waste management: although waste management fees require <1−2% of householdIncome in all Baltic Sea region (BSR) countries, the fees in the eastern BSR are generallytoo low to ensure self-sufficiency of waste management and adequate investment intowaste management facilities (RECO, 2013). Thus, EU structural funds are still playing animportant role (RECO, 2012b).

The two groups both have to adhere to the EU waste legislation, although the easternneighbors still have somewhat different targets and implementation schedules.

However, this 'two-speed Europe' approach is set to be phased out, implying significantchallenges in terms of infrastructure modernization, optimization of institutional and legalset-ups and securing adequate sustainable financing less dependent on EU cohesion funds.

The non-EU countries of Russia and Belarus form another group in the BSRwitheven less developed waste management sectors and weak institutional and administrative set-ups in terms of effective standards (Perelet and Yablonskaya, 2011). Most of the municipal waste is landfilled, and very few landfilling sites are comparable to those acceptable by EU. Separate collection and recycling levels are gradually increasing, but they are still very low (Figure 2). Financing the development in these countries may be an obstacle, as they are not eligible for the majority of EU financing. The state plays dominant role in setting municipal budgets and regulating tariffs for local public services(incl. waste management) (RECO, 2012a). Whilst the municipalities are weak, they are still legally responsible for organizing waste management similar to the other countries inthe BSR. The involvement of the private sector is emerging but is very marginal and not yet transparent.

3. Research and education on waste management at universitiesin the Baltic Sea region

Countries on the Eastern side of the Baltic Sea may require developments in shifting waste management up the waste hierarchy. Of course, each country has to find its own way, but at the same time it is possible to learn much from those who have made this shift and those who are leading in the development. Research carried out by academia can contribute to searching for the best waste management scenario for the particular country, as well as for a proper overtake of experience accumulated in the other countries. For countries on the Western side of the Baltic, the transition towards more sustainable waste management means a further improvement of their already mature systems. Thus, they need new ideas, innovations, new targets – everything that can beoffered by qualified researchers from Universities and other research institutions.

Educating future specialists who will take care for waste management in the near futureand who will be taking decisions, is another possibility of Universities to play their roletowards sustainable waste management systems.

Universities in the BSR are involved in research on various waste managementtopics. The most active in this field are German, Danish, Swedish, also FinishUniversities. The topics of research cover various waste treatment technologies, waste generation, prevention, recycling as well as various waste management strategies (e.g., Helftewes et al., 2012; Damgaard et al., 2013; Bernstad et al., 2013; Teerioja et al.2012).

Fewer researchers on the Eastern side of the Baltic Sea are conducting researchin the field of waste management and waste treatment technologies; see the work of e.g.,Den Boer et al. (2012), Rimaitytė et al. (2010), Dace and Blumberga (2012), Moora et al.(2006). Looking at example of Western BSR countries it is apparent that more intense research, covering the critical for the countries topics, can foster sustainable waste management. The need on the Eastern side is to analyze and propose suitable waste management solutions, to investigate waste management technologies and advocatefor the most relevant ones.

In both the Eastern and Western Baltic countries, courses on waste management and treatment can be found in curricula of numerous universities having study programsrelated to the environment. The big

benefit for courses is when they are being based on ongoing research at the University. Internationalization is another benefit both to research and to study courses, and requires participation of researchers and professors in bi-lateralor multilateral projects and exchange projects.

4. **Regional projects on waste management. RECO** Baltic

The BSR Program 2007–2013, or INTERREG IV B Baltic Sea region, was designedunder the European Community's territorial cooperation objective (BSR, 2007). Thestrategic objective of the BSR Program is to strengthen the development towards asustainable, competitive and territorially integrated BSR by connecting potentials over the borders.

RECO Baltic 21-Tech (RB21T) project, one of the BSR Program 2007–2013co-financed projects, was acknowledged as both a EU Strategy for the Baltic Sea region(EUSBSR) flagship (i.e., a project is mentioned in the Action Plan of EUSBSR) and aCouncil of Baltic Sea States (CBSS) Lighthouse project (i.e., a project is officially registered by the CBSS owing to its far-reaching regional impact and interest)(www.recobaltic21.net). It encompassed universities, research centers and companies,which worked hand in hand in the search for solutions for the problems associated with waste management, which is a matter of great concern to BSR countries, where significant national disparities are seen. The directly participating universities were Hamburg University of Applied Science (HAW), Gdansk University of Technology(GUT) and Kaunas University of Technology (KTU). Lund University was an associatedpartner in RB21T project. University of Latvia, Tallinn University of Technology andBelarusian State University had indirect links to the project via staff who participated inRB21T activities as representatives of other research institutions or associations, but atthe same time have tasks at these universities as well. This way, universities from all countries participating in RB21T were included. The other institutions, taking part in the project, were research institutions IVL Swedish Environmental Research Institute (Sweden) and SEI-Tallinn (Estonia), as well as a number of associations, municipalities and business development organizations.

The current project had a predecessor, a project on Regional Cooperation in WasteManagement (RECO), also co-financed by ERDF funds and carried out during 2005–2008. Thus, RB21T relied on a solid

and devoted partnership and continued working on fostering sustainable waste management (WM) in the BSR. The duration of RECO Baltic21-Tech was from 2011 until the end of 2013. Its overall objective was to improve the localand regional capacity to apply the process of implementing waste management thatcatalyze the execution of the EU Directives and supports the region to climb in the waste hierarchy.

5. Mutual benefits: impact on project results and achievements for universities

Education for sustainable development might be understood as the integration of sustainable development in the education, research and operations of a university(Staniškis, 2013). Thus, university has four roles in society: it acts as an educational institution and shall deliver sustainably educated professionals; it is a research institution and delivers the results of research to society; it has, as all organizations, all kinds of operational interactions with the outside world, such as procurement, use of materials, energy and water, the production of waste, etc., and finally it has a direct interaction with society, e.g., by participation in environmental or cultural events, etc.To achieve its aims and to help the BSR climb in the waste hierarchy and movetowards a more sustainable waste management, RECO Baltic 21-Tech included a varietyof activities. Participation in these activities enabled universities to meet most of the above-mentioned roles.

5.1   Capacity building

As stated by (Agamuthu and Hansen, 2007), there are many opportunities for interaction between universities and other institutions (business, municipality administrators, governments and NGOs) to build knowledge and intercultural stable societies. Capacitybuilding in higher education and research is one way of increasing capacity for fair global, regional and sustainable development. A number of universities in the BSR have experiences working across cultures and cooperating with distant regions, such as DanishUniversities with universities in Thailand, Malaysia and South Africa (Agamuthu andHansen, 2007; Wangel et al., 2005).

RB21T included study visits among its activities, aimed at building capacity of various stakeholders by sharing expertise and experience, by

showing good practice examples within the BSR. Representatives of the participating universities have been among those participating in the study visits to a newly constructed MBT plant in Estonia, plastic recycling company in Lithuania, anaerobic digestion plant for food wastein Hamburg and municipal waste management center in Sweden, etc. Some of the study visits have been combined with the regional waste management conferences that wereorganized by RB21T on sustainable waste management issues. The conferences consistedof presentations by invited speakers and discussions of relevant and topical issues.

The conferences attracted numerous participants from authorities, waste management companies and academic institutions from the whole region. The conferences wereorganized namely in Eastern countries to make them more accessible for locals and tomaximize the benefit from knowledge and experience sharing and transfer.

RB21T initiative, the so-called Baltic Waste Management Council (BWMC), is a continuation of the previous RECO project tradition. BWMC meetings take place at least once a year. This way the project aimed to facilitate for decision makers at local andмregional levels to optimize their waste management investments, to share problems and achievements. BWMC was used as a reference group when creating joint Baltic Sea region strategy for municipal waste management (RECO, 2013) – one of the major project outcomes. In many instances the project conferences, study visits, BWMCmeetings took place in connection with each other, enabling a multi-level stakeholder dialogue.

A database on waste-management related information has been created during the project. It includes information on countries around the Baltic Sea in addition to information on companies and organizations, which are providing waste management technologies, or dealing with waste management themselves, in the BSR. Another important aspect is the inclusion of reference objects, which are pilot projects that wereundertaken during the RB21T. There have already been some study visits to these reference objects, e.g., by Belarusian delegation including practitioners and academics.

Universities' capacity building was not limited to internal project activities, but researchers were also given the possibility to join the study tour organized by ISWA,to take part in a number of international conferences, exhibitions and other events.

The overall results include increased professional knowledge on different waste management systems, understanding of their functioning, of advantages and disadvantages, understanding of existing and emerging treatment technologies, of approaches and practices, skills to apply software for waste management planning, increased functional competences, e.g., cooperation, coordination of work, data collection.

5.2   Research

In total, 18 pilot projects related to 'hot topics' – biodegradable waste management and treatment technologies, recycling of secondary raw materials, and biogas from landfills –have been carried out during the project in Estonia, Latvia, Lithuania and Belarus,including participation from academics from the aforementioned countries. The researchprojects addressed an array of research questions depending upon the type and needs ofthe particular pilot project. The research activities therefore included feasibility studies,environment impact assessments, business plans and other technological, environmental, economic and social dimensions related to the waste management projects. The aim was to unlock investments of €20 m into waste management and treatment facilities.

Furthermore, developing concrete waste management or treatment pilot projects enabledthe identification of the main challenges, which are being faced by municipal and privateproject developers.

Researchers and lecturers sometimes interpret sustainable development too narrow,too specifically concentrating on only one of the three dimensions of sustainabledevelopment, mostly on the environmental aspect in the case of technical disciplines(Staniškis, 2013). RB21T has a few important outcomes, which show the relevance of all these aspects when striving for a sustainable waste management. Theseimportantoutcomes are:

- *Joint Baltic Sea region strategy for municipal waste management (RECO, 2013)*

The region was lacking a common vision and a shared strategy for how to address theproblems of sustainable municipal waste management and take best advantage ofinternational collaboration in using countries' experiences, best practices and sharingcapacities and infrastructures. To facilitate the higher-order waste management hierarchysolutions, a common vision and a joint strategy for the BSR have been developed.

They are targeted towards decision-makers on an EU, national and local level.

- *Baltic waste investment concept*

It aims to assist all stakeholders in making the required sustainable investments intowaste management projects.Life cycle assessment (LCA) has been used to support decision-making in old EUmember states of the BSR for over a decade. The Technical University of Denmark
(DTU) and IVL Swedish Environmental Research Institute are the two leaders in theregion, having developed specialised software tools EASEWASTE and WAMPS,respectively, for waste management planning based on LCA. It is now being graduallyintroduced into the decision-making processes in the new member states as well(Moora et al., 2006; Miliūtė and Staniškis, 2010). Tallinn University of Technology andKaunas University of Technology have cooperated in the development and use ofWAMPS already during the previous RECO project, resulting in a couple of PhD thesisproduced (Miliūtė, 2009; Moora, 2009). Development and use of WAMPS continuedduring RB21T. It has been applied in a few pilot projects, namely
•in development of regional waste management plan
• in development of mechanical biological treatment of municipal waste in the Alytusregion (Lithuania)
• in development of the bio waste composting system in the city of Narva (Estonia)
• in development of a pre-treatment method for bio waste in Piejura waste managementregion (Latvia).
For the latter case, one more university, i.e., University of Latvia and its PhD student, hasbeeninvolved.

5.3   Education

Although WAMPS is primarily to be used as a tool and as a support for decision in theplanning process for designing the most suitable systems from an environmental point ofview for waste management in a certain region with its specific conditions, it is also auseful tool which may be employed by students in their learning process. So in additionto being used by doctoral and MSc students for their research and preparation of thesesduring the RECO project,

WAMPS has enriched the contents of the study course'Integrated waste management' in MS program in Environmental Management andCleaner Production at KTU, Lithuania.

Students benefited both via direct participation in the project events (conferences,study tours) and via the lectures, which provided the students new knowledge and experience broadened to the regional scale, adding the regional waste managementperspective to the contents of courses on waste management. RB21T provided studentsfrom the region with the opportunity to conduct problem-oriented projects based onreal-world cases. Examples of such projects are analysis of waste management situationin countries of the region, use of decision-making tools in the region, impact of wastemanagement on territorial development, RDF production possibilities from sewagesludge.

One more output of RB21T is the development of an internet database, administeredby GUT, with information clustered into various waste management related themes.

Information is organized in such a way, that it can be used to prepare various wasterelated trainings for different stakeholders, or lectures for students.RB21T experience inspired organizing a summer course on sustainability and wastemanagement in the Baltic 'Making Waste Work'. It was organized in cooperation of theBaltic University Program (it is a network of ~225 universities and other institutesof higher learning throughout the BSR) with RB21T at HAW. The course offered astate-of-the art overview of matters related to sustainable development and waste management provided by international experts from the BSR. Students from varioussubjects currently registered at universities across the Baltic Sea attended the summercourse, which was fully booked shortly after publication, thus showing the relevance of the topic.

5.4   Otherremarks

Regarding operational interactions of organizations with the outside world, RB21T wasfocusing on procurement issues to contribute to capacity building of institutions dealingwith waste management. The project did not directly deal with operations of universities.

Nevertheless, as management of biodegradable waste and waste recycling were amongtopics of the pilot projects, they contributed with ideas to the development of paper wastemanagement and green waste management at KTU. A couple of M.Sc. theses have beenprepared on

these topics, and paper waste management has already been put into practice (Adomavičiūtė et al., 2012; Kliopova and Stanevičiūtė, 2013).

6 Conclusions

In spite of differences between countries in the region, e.g., in waste managementmethods and practices, geographical proximity is a common denominator for countries'concerns over the state of the environment to share experiences. It is argued thatuniversities' participation in regional cooperation projects can bring mutual benefits toboth society via the project results, and to universities themselves.

For the Baltic Sea region, where significant disparities among the countries exist,collaboration of universities from these different countries created capabilities tocontribute to the exchange of experience between the countries, to compare and learnfrom different systems, and to suggest ideas for further development towardssustainability.

At the same time the project has demonstrated that a special challenge to wastemanagement authorities is to find resources to keep involved in regional cooperationactivities and to respect project results.

The participating universities themselves have improved their capacities (professionalknowledge, skills, functional competences), enriched the contents of courses on wastemanagement (use of WAMPS, view on waste management issues from the regionalperspective, etc.), enriched education with summer courses, offered students real-lifetopics for their projects, and interesting topics for research. Although this is valid for universities from all the participating countries, it is important to mention thevalue-added for those on the East-side, as namely these universities need to be moreactive in waste-related research and in contributing to sustainable waste management intheir countries and the region.

As waste management practices are an evolving process and improvements willconstantly be required, regional cooperation projects proved to be a good means toestablish partnership between academia, authorities and business, which can be utilizedagain and again to work on emerging issues.

At the same time more universities and research institutions should become involvedin regional cooperation to benefit from it, what would increase competition betweenUniversities. Therefore, a future challenge

and future prospect for universities andresearch institutions is to be more active in finding common research topics.

Regional cooperation and practical projects, where theories are applied and differentsystems are compared, are important to support a process of institutional change. RECO

Baltic 21-Tech is a 'good practice', which can be taken as an example for similar initiatives across the regions.

Задания для самостоятельной работы.
1.Выберите статью из представленных выше, определите ее выходные данные.
2.Прочитайте выбранную статьюи охарактеризуйте ее композицию.
3.Разделите выбранную статью на логические части. Поставьте на иностранном языке 3-4 вопроса к одной из частей
4.Определите главную идею каждой части, переведите аннотацию и ключевые слова.
5.Определите главную идею статьи целиком,переведите аннотацию и ключевые слова
6.Составьте реферат статьи в письменном виде на английском и русском языках.
7.Выберите оригинальную статью на иностранном языке по своему направлению подготовки,определите ее выходные данные.
8.Прочитайте выбранную вами статью по вашему направлению подготовкии охарактеризуйте ее композицию.
9.Определите главную идею выбранной статьи .
10.Составьте реферат статьи в письменном виде на английском и русском языках.
11.Напишите аннотацию к своей научной статье и переведите ее на иностранный язык
12.Подберите ключевые слова и переведите их на иностранный язык.

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