
2014/2015
Excellence in Upper-Level Writing
The Gayle Morris Sweetland Center for Writing

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Edited by
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Introduction

Ask any professional, business person, or employer about one of the most important qualifications for college-educated workers, and the answer will be nearly universal: the ability to write well. The Upper-Level Writing Requirement (ULWR) was established to enable undergraduates in the College of Literature, Science, and the Arts to develop their capacities as writers. Originally designed in 1978 to help students "understand and communicate effectively the central concepts, approaches, and materials of their discipline," the ULWR supports a slightly different goal in today's more interdisciplinary context. A significant percentage of students now have more than one major or fulfill the ULWR outside of their majors. Likewise, many faculty members are increasingly concerned with preparing students to write for various professional and public audiences as well as for discipline-based ones. However, whether students fulfill the ULWR within or outside of their majors or write for audiences within or outside of the academy, they are held to the same standards of effective writing.

This collection demonstrates the continuing value of the ULWR. Courses like the ones in which students produced these essays create contexts where students meet the expectations of the ULWR and can push beyond them to an even more impressive level of accomplishment. While the specifics of what counts as evidence and how one makes a convincing argument vary across the essays included here, each one embodies qualities that mark effective writing. The authors deal with a wide variety of topics, but in every case they combine deep understanding of a specific area with excellent prose. They take risks and adhere to conventions; they synthesize complex ideas and provide rich detail; they exert intellectual independence and respect disciplinary conventions, from creative nonfiction in the humanities to empirical research in the sciences.

We have been honoring students for outstanding writing in ULWR courses since 2010, but since 2014, thanks to a generous gift from the Granader Family, the prizes are more substantial. We are grateful to the Granaders for

choosing to recognize student writing in this way. This collection is another form of recognition for the award-winning students. By publishing this student writing both online and in hard copy we make it available as a model and as a source of inspiration for others.

Talented and committed as they are, these students represented here did not become award-winners entirely on their own. Each of them benefited from well-designed assignments, careful reading, and suggestions for revision from the instructors who nominated them. The instructors' introductions for each selection provide a window into student learning as well as into the specific dimensions of each student's achievements.

It is both inspiring and humbling to see the excellent writing produced by our students. The judges who selected the award-winning essays from all of those nominated did not have an easy job because they had to choose from among so many fine pieces of writing, and thanks are due to them for their efforts.

The Sweetland Fellows Seminar participants—faculty and advanced graduate students committed to integrating writing into their courses and helping students become better writers—serve as judges for the Granader Family Prize for Excellence in Upper-Level Writing. This year's readers include: Julie Boland, Paul Conway, Zac Garlets, Nev Koker, Petra Kuppers, Francesca Minonne, Will Nediger, Biz Nijdam, Adam Simon, and Jing Xia.

I am also grateful to Dana Nicholas and Jing Xia for their careful editing and to Aaron Valdez for his design features, which show the student writing to its best advantage.

David Gold, Acting Director
Sweetland Center for Writing

Winning Essays
Granader Prize for Excellence in Upper-Level Writing (sciences)

Tracking Seasonal Evolution of Subglacial Transport System at the Lemon Creek Glacier, Alaska, USA

Anna Clinger

From Earth 442: Earth Surface Processes and Soils
(nominated Sarah Aciego)

Ms. Clinger's work describes one of the most important glacial changes impacted by projected climate change: the evolution of glacier hydrology using a combination of quantitative calculations and qualitative descriptions. Her paper is well-researched and well-written and I was impressed by her synthesis of a wide range of texts in order to describe the processes in action as well as provide a critical analysis of expansion and contraction of the drainage network under the Lemon Creek Glacier in Alaska. The resulting paper presents her methodology, results and implications with clarity, which is often sorely missing in scientific texts. The combination of clear writing and well-produced original figures (an important aspect of scientific writing) makes Ms. Clinger's paper the best of the 442 class this year.

Sarah Aciego

Tracking Seasonal Evolution of Subglacial Transport System at the Lemon Creek Glacier, Alaska, USA

Abstract

Seasonal meltwater flux plays an important role in predicting downstream ecosystem sensitivities. The transport pathways of water beneath a glacier are subject to change as melt seasons progress due to variability in the balance between basal water pressure and water flux. Various aspects of subglacial hydrology have been well studied, but the understanding of the spatial channel configuration is less well constrained. Daily in-situ measurements from the summer of 2012 at the Lemon Creek Glacier (LCG), Alaska, USA, and extrapolated bedrock slopes were used to construct a seasonal model of the transport system and its capabilities. We track a seasonal expanse and decline of the drainage network and characterize the conduits as high transport agents. A maximum grain size of 17.26 m within a hydraulic radius of 0.59 m whereas a maximum grain size of 8.05 m within a radius of 0.27 m represent the extreme predictions at high sloped region situated near the annually draining Lake Linda on the 13th of July and 1st of September, respectively. Values of 0.29 m and 0.14 m correspond to the lower reaches near the glacial toe. The coupled decrease in transport ability and slope downglacier may have compounding effects on the depositional environment and subsequent sediment transport. Further unconstrained complexities regarding local strains and bedrock deformations stress a needed focus on temporal and spatial subglacial dynamics to assess potential impacts on downstream biogeochemical cycles.

Introduction

The predicted escalation of glacial retreat over the next 20 years imparts fundamental importance on quantifying the relationship between the hydrology and environmental impact of deposited glacio-fluvial sediment (USGS). Subglacial processes contribute to significant chemical and physical erosion. As ice physically weathers underlying bedrock and subglacial meltwater flows rapidly through conduits, fine grained sediment can be produced that affects the

chemical composition of the meltwater and the subsequent state of downstream ecosystems. The impact of sediment release is widely variable and dependent upon the geography, geology and ecology of the downstream environments. For example, increased flow regime can increase evacuation of fine sediment from gravel-composed salmonid breeding beds (Ligon et al., 1995). If the process leads to armouring, the condition where coarser sediment overlays finer sediment and prevents the fine gravel from being transported out of the system, it can reduce the availability of substrate for spawning (Armstrong et al., 2003). However, increased amounts of fine sediment may cause detrimental effects by smothering salmonid embryos (Phillips et al., 1975). These sensitivities towards fluxes in sediment suggest that investigating the rate and scale at which hydrological change is occurring may provide insight into the ecological responses toward impending hydrological variability.

The englacial and subglacial transport pathways of water are subject to change as the meltseason progresses. While physical inaccessibility inherently limits study of the subglacial environment, the current literature maintains a robust, schematic model of channelized system with regards to genesis and geometry of passages, rate of drainage, and variation in basal water pressure (Fountain and Walder, 1998; Hubbard and Nienow, 1997; Kamb, 1987; Nienow et al., 1998). The subglacial drainage system is composed of a series of conduits incised into the glacial bed and can be classified into two categories: an arborescent, fast hydraulic system and a nonarborescent, slow hydraulic system. Here, the term *fast* implies that relatively small changes in the bulk water volume invoke a large response in discharge whereas the term slow implies that relatively large changes in the bulk water volume invoke only a small change in discharge (Raymond et al., 1995). However, it is important to note that the system is not defined seasonally or spatially to a single configuration (Fountain and Walder, 1998). Nienow *et al.* (1998) assessed hydraulic dispersion through the subglacial network using the conventional dye method to better constrain seasonal evolution. The study demonstrated that fast, hydraulically efficient channels tend to dominate

slow, hydraulically inefficient networks as the meltseason progresses and the channels expand up-glacier. Further, it follows that topology of the glacial beds relate to the persistence and stability of subglacial structures as sliding and its corresponding internal deformation relate to bed roughness (Nye, 1970). It is apparent that the immense, and increasingly understood, number of parameters can impose difficulties on modeling of system dynamics. Nonetheless, by interpolation from data of glacial discharge, underlying bedrock lithology, and the corresponding ice and bedrock profiles, a quantifiable representation of seasonal evolution is obtained.

Increases in sediment load and transport capacity increase the ability of the subglacial and proglacial outflow to erode the bedrock. Erosive features, suspended sediment flux, and bedrock slope function dependently upon fluxes in flow velocity and discharge (Alley et al., 1997). Allen et al. (1985) empirically determined a greater-than-linear relationship between suspended sediment and subglacial flow velocity and discharge using system turbulence and strain-rate principle. While specific models of subglacial pathways are limited by physical inaccessibility, supraglacial processes exhibit control on discharge patterns. Discharge often varies temporally. Increased melt is an observed mechanism for increased discharge and increased bedload transport capacity (Alley et al., 1997). Thus, seasonal and annual discharge trends place an import on determining the erosive effectiveness of the subglacial system. However, the nature of the erosion can depend on whether the system is at its full transport capacity. A poorly developed network may limit bedrock-water interaction and lead to a preponderance of water-erosion features. Further, an observed higher sediment capacity of glaciofluvial outflow in comparison to traditional fluvial systems correlates to the typically higher ice margin slopes in comparison to typical lowland river slopes (e.g. 0.01 versus 0.0001, respectively) (Alley et al., 1997; Bloom, 1991). Thus, the potential effectiveness as agents of erosion places particular import on characterizing the temporal range of variability of transport the system undergoes. By determining an endmember for transport at the extent of continuous

flow through the subglacial environment, a primary understanding of the erosive capabilities can be established.

Here, we present a time-series analysis of hydraulic change of the Lemon Creek Glacier (LCG), Juneau Icefields, AK (58º 24' N, 134º 22' W, 11.6 km2) (Figure 1). The LCG is a temperate, alpine glacier located on a Mid-Cretaceous central pluton-gneiss belt. LCG flows northward and the underlying lithology gradually shifts from carbonaceous shales and mudstones in the southwest to tonalite sills and high-grade metamorphic rocks in the northeast (National Oceanic and Atmospheric Administration, 2012). From the glacial head to toe, the glacier extends from 1400 m to 820 m above sea level (Mernild et al., 2013). A key link between the supra- and sub-glacial drainage components is the supraglacial Lake Linda that drains directly at the head of the LCG. Each summer, a sudden, complete release of lake water defines the system. The water surges through an englacial cave where it increases hydrostatic pressure (Marston, 1983). The event may facilitate calculation of a representative maximum velocity of subglacial water and the sediment transport capacity, upon a simple model of the bedrock slope beneath the ice. The LCG is an ideal site for interpolation as an extensive catalog exists in the literature with regards to the seasonal discharge, satellite-determined ice depths, and surface mass balance (Mernild et al., 2013; Stevenson et al., (In Prep.); Thiel et al., 1957).

Methods

Sample collection occurred at the main meltwater channel from the 30th June 2012 to the 8th September 2012. Daily *in-situ* measurements of conductivity, temperature, pH, dissolved oxygen, and alkalinity were recorded using a YSI Multiparameter probe as well as discharge and maximum velocity measurements using an Acoustic Doppler Velocimeter Flowtracker to monitor seasonal changes in discharge. Additional detailed field protocols are outlined in Arendt et al., in Review. Thiel *et al.* (1957) estimated ice depth profiles along four cross-sections of the LCG using gravity measurements. The 1957 aerial photograph showing the traverses was georeferenced to a digital elevation model

(DEM) in ArcGIS (NOAA, 2012). The DEM included surface elevations (Fig. 1) and the Measure tool allowed horizontal distance to be calculated from the georeferenced points; thus, enabling an estimation of the bedrock slope. The model assumes an ice depth of zero meters along the perimeter of the LCG (e.g. the inflow at Lake Linda and the outflow at the toe). The ratio between the difference in bedrock elevation from Lake Linda to the outflow and the horizontal distance from Lake Linda, the center of transect points, and the meltwater outflow represents the estimated average slope.

The seasonal evolution of channel dimensions and maximum sediment transport were calculated using the following equations. We calculated cross-sectional area by:

(1) $A=QU,$

where A is the cross sectional area in m^2, Q is the daily total discharge (m^3/s), and U is the daily maximum velocity in m/s. While borehole and dye tracing work by Hooke *et al.* (1989, 1990) suggests a flatter channel shape, we assume a semi-circular cross-section where the hydraulic radius (R) is $\sqrt{(2A/\pi)}$. The maximum diameter of the median grain size that is mobile at recorded conditions was calculated by balancing boundary shear stress and critical shear stress.

(2) $D=\rho_w g\, RS/(\theta_c(\rho_s-\rho_w)),$

where D is the maximum median grain size that is mobile (m), ρ_w is the density of water (1,000 kg/m3), g is the gravitational constant (9.81 m/s^2), R is the hydraulic radius (m), S is the estimated bedrock surface slope (m/m), θ_c is the dimensionless Shields parameter (average value of 0.045 used), and ρ_s is the density of sediment (crustal average of 2,650 kg/m^3).

While the study brings forth important implications on seasonal evolution of the subglacial meltwater, it is important to note analytical constraints.

Daily fluctuations in discharge and flow velocity mark a first-order source of variability. While high cloud cover, humidity, and an average of 0.17" of precipitation characterize the Juneau region (National Climate Report Juneau, AK, 2013), the averages do not imply consistency from day to day. The National Oceanic and Atmospheric Administration report a wetter than average summer of 2012 (National Climate Report Juneau, AK, 2013). As a point of interest, the 29th of July marked a change in the measurement site up-glacier. However, no significant change in the channel dimensions and flow characteristics was observed.

Results

Table 1 in Appendix 1 summarizes the LCG watershed elevation profile. Measurement determined a distance of 6095.3 m along the central divide. The extrapolated slopes of the LCG bedrock are listed in Table 1 and visually represented in the schematic cross section (Fig. 2). Slope generally decreased toward the glacial toe with the greatest bedrock slope (0.22 m/m) calculated between the inlet at Lake Linda and transect D-D' and the lowest bedrock slope (0.0037 m/m) calculated between transect A-A' and the glacial toe.

The predicted seasonal evolution of channel dimensions is shown in Appendix 1, Table 1. A sixth order polynomial was fit to the dataset (coefficients listed in Appendix 3) and tracks the general trend. From late June to mid-July, the data exhibits an expansion of hydraulic radius and cross-sectional area (maximum values of 0.49 m and 0.55 m^2, respectively). From mid-July to early August, the dimensions exhibit a poor trend toward smaller dimensions, but daily variation is apparent. We observe a large spike in values on September 2nd and the predicted minimum (radius of 0.28 m and area of 0.12 m^2) occurs on the final sampling day of September 1.

We characterized the subglacial channels as a high transport system. The maximum diameter of sediment transported follows the same trends as the hydraulic radius and cross-sectional area. The slopes of five sections shown in Table 1 characterize five separate flow regimes. Table 2 summarizes the seasonal

variability of maximum grain size for each of the regimes. Here, we observe the bounds of the dataset. While the initial maximum transport diameter is 17.26 m from Lake Linda to transect D-D' in mid-July, the model predicts a sharp decrease in diameter to a maximum of 0.290 m in the section from transect A-A' to the glacial toe. Similarly, the 1st of September measurements predict a decrease in maximum diameter of 8.05 m and 0.14 m for the Lake to D-D' transect and A-A' transect to glacial toe, respectively.

Discussion

By integrating *in-situ* measurements with a simple, force model, we have constructed a schematic model of the seasonal evolution of the LCG subglacial transport pathways (Figure 3 and Table 1 in Appendix 1). However, the physical barriers to the subglacial environment place formidable challenges to our interpretation of flow dynamics. The shifts in basal conditions allow for shifts in transport load and capacity. Factors such as daily climatic variability or undetermined meltwater storage and release may affect interpretation of observed trends. Similarly, factors such as non-uniform bedrock stresses or local topographical variation could lead to an overestimation or oversimplification of the sediment transport capacity of the model. Nonetheless, shortcomings of the model emphasize which controls affecting channel growth and decline require further investigation.

The heavy reliance on outflow characteristics as analytical tools may impede interpretation as it implies there is a consistent, direct relationship between subglacial and proglacial events. Potential lead-lag cycles may occur at varying rates. Such relations may include seasonal snowmelt flux. While the conjecture between daily variability and the slight trend growth and decline of channel geometry from late June to early September emphasize a dynamic system (Figure 4), it is important to note the contribution of surface snowmelt to the bulk flow. As the season progresses and temperatures increase, there will be less of a contribution of surface snowmelt to the bulk subglacial flow. The general trend may

correlate with the steady decline in predicted channel dimensions that begins in mid-July (Figure 4).

Further, the annual, episodic surges of Lake Linda build the foundation for the slope calculation and, thus, are the basis for our sediment transport model. The events imply that the subglacial channel extends from the glacial head to toe for segmented, undefined periods of time. The lack of a 2012 record of Lake Linda surge events adds uncertainty which may not correlate with discharge trends as maximum discharge measurements in 2002 did not align with the annual outburst events (Walton, 2002). Noting the range of daily precipitation intensity from 0 to 307 mm from the 5th of July to the 8th of September at the LCG (National Climate Report Juneau, AK, 2013), climatic inputs may play a role in the temporal and spatial distribution of meltwater contributions as well (Figure 3).

In an attempt to unravel the glaciological coupling between local drainage and storage, we narrow our focus on the anomalous increase predicted hydraulic radius and meltwater velocity that begins on the 2nd of September (Figure 3). In-field descriptions remark on significant increases in channel depth (~6 inches), channel width (~1.5 feet), velocity, and sediment load. One proposed explanation is local hydromechanical disruptions causing a minor outburst of stored water, commonly known as a jökulhlaup. Such events are derived from mounting levels of water pressure that are overwhelmed by increased hydrological stress such as sudden fluctuations of channel routing (Russell et al., 2006). High rates of precipitation correlate with the surges and, here, we refer to the intense and unrelenting rain event, which spanned from the prior day to the time of sampling (Figure 3). As the rainwater washed through the system, the increased flux may have overburdened dammed englacial or subglacial water, which may have instigated rapid release of the bulk volume. The subsequent routing (e.g. sheet-like expanse versus channelized flow as referred to in Magnusson et al., 2007) and entrainment of sediment depends of the bedrock

morphology (Rippin et al., 2003). A drive to understand the level of channel containment beneath the ice evokes questions on the development of erosive and depositional structures in the subglacial environment.

The potential formation of sedimentary structures relates to the sediment transport capabilities of the system. While it is important to note that the model may be inaccurate or too simple for subglacial analysis, the model suggests that all the sediment should be mobile. The predicted maximum grain size suggests a high potential of grain mobility at the LCG. In fact, at locations closer to the glacial head, the model predicts mobility of grains beyond the dimensions of the hydraulic radius. While the high maximum grain size to hydraulic radius ratio (e.g. ~29.31:1 along the Lake Linda to D-D' transect) necessitates review of the model assumptions (Table 2 in Appendix 2), we acknowledge the potential existence of a system simply transporting all sediment it encounters. Such a system would likely exhibit stable, nearly fluvial meltchannels as the high driving force upon the sediment would remove any sediment within the channels.

Slope variability is critical to understanding sediment mobility. An initial constraint is the estimation technique used to georeference the 1957 depth transects. The gravity determined depths hold uncertainty described in Thiel et al. (1957) and due to the ~60 year period since measurement (Figure 1). The gravitational model assumes that the measurement stations, which are located at each end of the transects, were located on an infinitely flat slabs of rock. A terrain correction was applied, but only took into account the bounding topographic ridges. However, the Juneau region is topographically varied and this could lead to small deviations from the measured values. Additionally, the LCG is a dynamic, retreating glacier (average 10-13 ma^{-1}) (Mernild et al., 2013); thus, we would assume the transect has migrated from the dimensions of Figure 1 and that physical processes beneath the ice have continuously shaped the bedrock. As the slope decreases downglacier, the maximum grain size declines and larger grains may immobilize. The immobilization could lead to the formation of

small barriers on the surface which would likely increase deposition, reduce flow velocity, and reduce channel erosion. Plucking, abrasion, and lodgment of the sediment in the bedrock may compound the effects as the production of micro cavities and interbedded grains may interfere and blockade pathways (Hart, 1995). Kruger (1979) points to clues in glacial till such as sorting and stoss-and-lee side orientation of grains while noting the transient nature of the structures. The common paradigm of fluvial systems adjusting to follow the path of least resistance and reduce potential energy supports the developing model of channel evolution.

Constraining the relationship between rate of bedrock deformation and sediment flux remains. Here, we focus on four topographical bedrock rocks limits: effective strain rates, subglacial water pressures, bedrock roughness, and underlying geology. Construction of a topographically varied bedrock surface would account for additional spatial and temporal changes due to water pressure and ice flow deformation processes. The current literature suggests effective strain functions as a series of individual events rather than a uniform force across the bedrock surface (Iverson et al., 1998). Greater strain rates have been calculated toward the margins of the system (Boulton et al., 2001). The implications for the dynamic system are large. For example, the "L" shape of the LCG would necessitate a channel extending from the glacial head to toe to change directionality. It is unlikely that the path would be linear so we can imagine that this will further variation in effective strain rates. Similarly, spatial and seasonal forcing from stored subglacial water could play a role in the balancing of forces upon the bedrock and affect deformation. Sharp et al. (1990) described a seasonal trend in subglacial water pressures through borehole measurements. Asymmetric distributions of water pressure could cause sediment removal to occur at disproportionate rates, which could result in an asymmetric distributions of erosive structures. The pressure effects likely hold particularly influence on temperate glaciers like the Lemon Creek, which perpetually lie at the pressure melting point.

The impact of spatially and temporally varied bedrock roughness is fundamental for making assumptions on Shields parameter (refer to Equation 2), which relates to sediment mobility initiation. A compiled analysis by Buffington and Montgomery (1997) predicts a wide range 0.030 – 0.073 of Shield's parameter for gravel-bedded rivers. It is unclear the order of magnitude the assessment has on the subglacial environment. However, the potential flow obstructions beneath the ice could similarly reduce the maximum grain size by twofold or greater. Still, a greater complication will derive from the rigidity of the bed, which relates to the underlying lithology of the LCG. The underlying geology of the LCG is primarily metamorphic (sections of foliated tonalite sill, high-grade metamorphic rocks, and carbonaceous shales and mudstones) which may reduce communition and erosive processes in comparison to more unconsolidated, sedimentary bedrocks (Hart, 1995). More constraints to the factors behind bedform deformation would facilitate construction of a dynamic subglacial environment.

Our simple transport model brings forth important ambiguities regarding seasonal evolution of the subglacial meltwater channels. We track a slight rise and fall of channels and emphasize the local non-uniformities. To address the unanswered questions, we press for new modes of analysis. An extensive and updated survey of bedrock slopes is essential to our analysis. Perhaps development in light detection and ranging mapping systems could help resolve details. With regards to tracking water storage, water source, and weathering beneath the ice, isotope geochemistry has shown success in detecting subglacial sensitivities (Arendt et al., (In Prep); Tranter et al., 2002). Hereafter, we will focus our attention on coupling seasonal evolution with isotopic signatures to assess the morphological nature of the meltwater system.

Conclusion

While hidden dynamics beneath the ice hinder our interpretation, we present an evolving model of channel development that is built upon a robust set of in-field measurements. The model captures a growth and decline of the system alongside an ample degree of daily fluctuations, which further supports

the dynamic nature of the system. While the model predicts complete mobilization of sediment, subglacial variables such as local topography and deformation rates may dismantle predictions on both the transport capacity of the network and downstream glacial sensitivities. Oversimplification of the drainage network could lead to large discrepancies between modeled and observed meltwater events. The importance of these implications directly correlates with the predicted escalation of glacial retreat. Thus, integration of field methods, empirical force balancing, and analytical chemistry may facilitate a greater understanding of seasonal evolution.

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Figures:

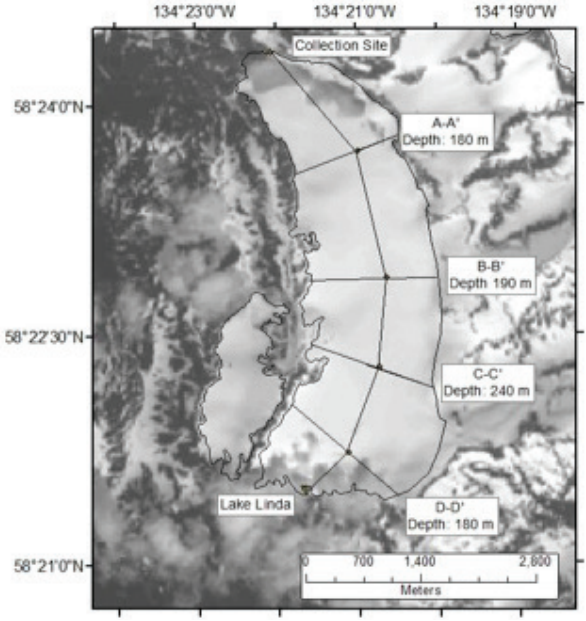

Figure 1: Satellite image of Lemon Creek Glacier (LCG), Juneau Icefield, Alaska (National Oceanic and Atmospheric Administration, 2012). Lake Linda drains annually and is located at the southern head of the glacier. Outflow measurements occurred at the toe of the LCG as labeled *Collection Site*. Gravity measurements by Thiel et al. (1957) were georeferenced to the map and used to calculate an estimated ice depth at each transects. The estimated maximum ice depths at the center of each transect is indicated below each label.

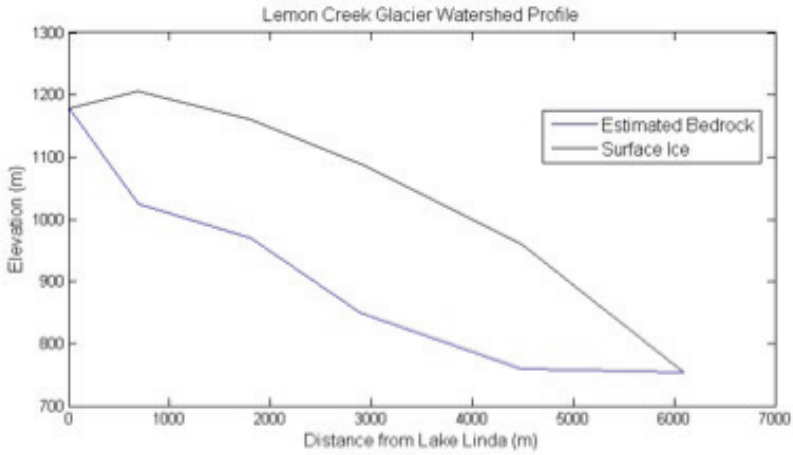

Figure 2: Profile of the LCG bedrock and surface ice elevations as extrapolated from Figure 1. The black line indicates the surface ice elevation and the blue line indicates bedrock elevation. Note: a trend toward lower bedrock slopes with increasing distance downglacier exists and may represent regions of lower than estimated transport abilities and increased sediment deposition beneath the ice.

Table 1: Estimated surface and bedrock slopes as extrapolated from digital elevation models (Figure 1) and values from Thiel et al. (1957).

	Estimated Surface Ice Slope (m/m)	**Estimated Bedrock Slope (m/m)**
Lake Linda to D-D'	-0.037	0.222
D-D' to C-C'	0.040	0.049
C-C' to B-B'	0.065	0.111
B-B' to A-A'	0.082	0.056
A-A' to Glacial Toe	0.128	0.004

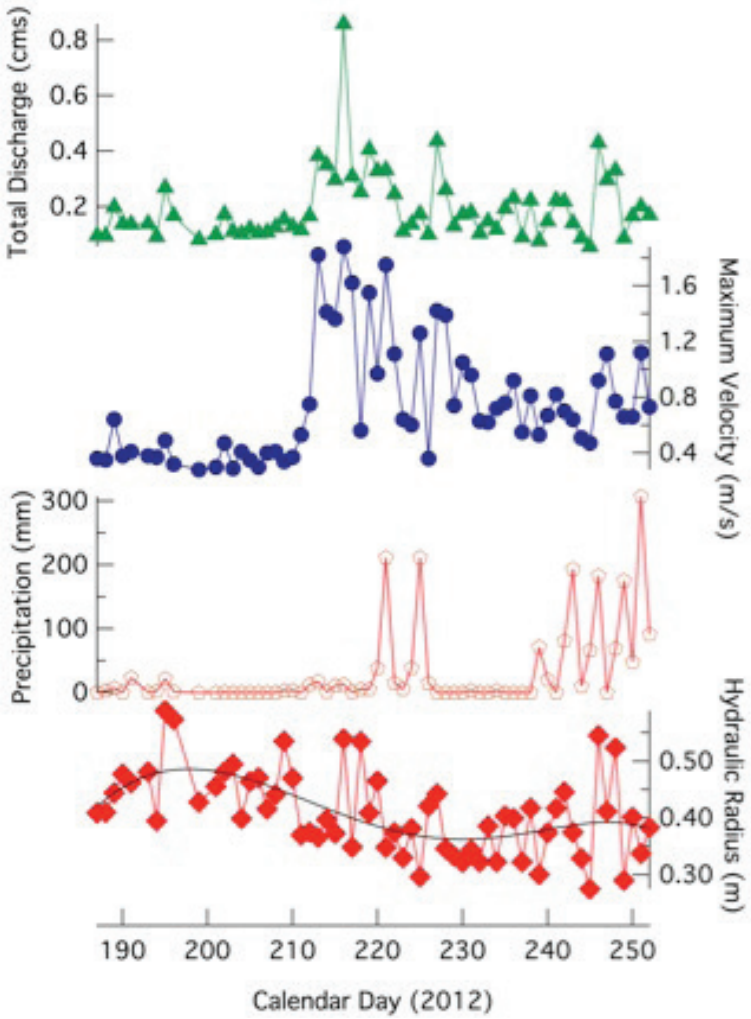

Figure 3: Triple plot of seasonal variability of maximum velocity (m/s), total discharge (cms), hydraulic radius (m), and daily precipitation (mm) from calendar day 187 to 282 (i.e. July 5th to September 8th, 2012). The total discharge and maximum velocity were measured directly. Precipitation measurements were recorded at a Juneau weather station (West Juneau Weather Archives). The model represents a seasonal expansion and decline of channel geometry. Note: a sixth degree polynomial (Appendix 3) was visually fit to the hydraulic radius estimations to show trend and is indicated by the black line. However, polynomial fits are not traditional methods for correlating variance and should not be held as statistically sound.

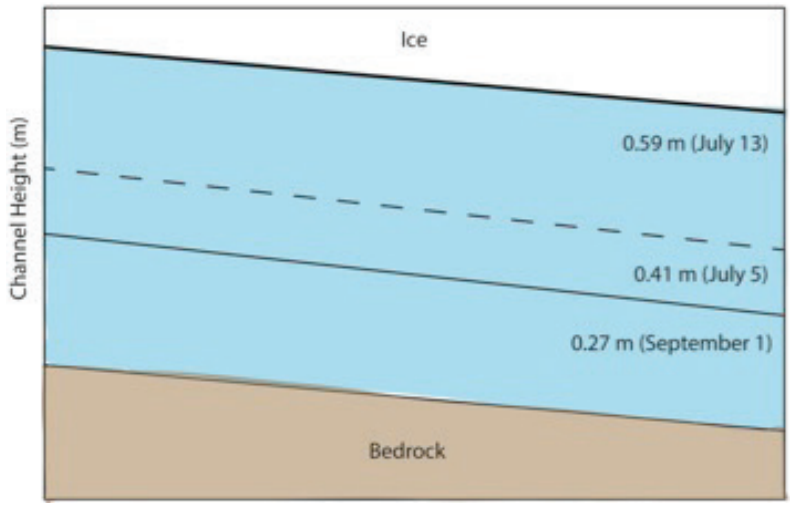

Figure 4: Schematic model of subglacial channel dimensions over the summer of 2012. The dashed line indicated the predicted hydraulic radius on the first day of sampling. The thick black line indicates the maximum predicted hydraulic radius of the season whereas the thinner black line represents the predicted minimum radius.. The model predicts a sharp increase in channel height over the course of ~1 week and slowly diminish as the season progresses.

Appendices

Appendix 1: Seasonal Datatables of Channel Dimension and Maximum grain size transport

Table 1: Seasonal variability in maximum velocity (m/s) and discharge (cms) alongside calculated cross-sectional area (m2) and hydraulic radius (m) as calculated by Equation 1 and assuming a semicircular shape.

Day of the Year	Maximum velocity (m/s)	Total discharge (cms)	Area (m2)	Hydraulic Radius (m)
7/5/12	0.36	0.0945	0.26	0.41
7/6/12	0.35	0.0934	0.26	0.41
7/7/12	0.64	0.198	0.31	0.44
7/8/12	0.38	0.1374	0.36	0.48
7/9/12	0.41	0.136	0.34	0.46
7/11/12	0.38	0.1387	0.36	0.48
7/12/12	0.37	0.0911	0.24	0.39
7/13/12	0.49	0.2674	0.54	0.59
7/14/12	0.32	0.167	0.52	0.57
7/17/12	0.28	0.0797	0.29	0.43
7/19/12	0.30	0.0984	0.33	0.46
7/20/12	0.47	0.1717	0.36	0.48
7/21/12	0.29	0.11	0.38	0.49
7/22/12	0.41	0.1021	0.25	0.40
7/23/12	0.35	0.1198	0.34	0.46
7/24/12	0.30	0.104	0.35	0.47
7/25/12	0.40	0.1075	0.27	0.42
7/26/12	0.41	0.125	0.31	0.44
7/27/12	0.34	0.1534	0.45	0.53
7/28/12	0.37	0.128	0.35	0.47
7/29/12	0.53	0.1146	0.21	0.37
7/30/12	0.75	0.1651	0.22	0.38
7/31/12	1.82	0.383	0.21	0.37
8/1/12	1.41	0.3493	0.25	0.40

Day of the Year	Maximum velocity (m/s)	Total discharge (cms)	Area (m2)	Hydraulic Radius (m)
8/2/12	1.36	0.2962	0.22	0.37
8/3/12	1.88	0.8588	0.46	0.54
8/4/12	1.62	0.3089	0.19	0.35
8/5/12	0.56	0.2515	0.45	0.53
8/6/12	1.55	0.406	0.26	0.41
8/7/12	0.97	0.3277	0.34	0.46
8/8/12	1.75	0.3319	0.19	0.35
8/9/12	1.11	0.2453	0.22	0.37
8/10/12	0.64	0.1094	0.17	0.33
8/11/12	0.60	0.1365	0.23	0.38
8/12/12	1.26	0.1732	0.14	0.30
8/13/12	0.36	0.0991	0.28	0.42
8/14/12	1.42	0.4362	0.31	0.44
8/15/12	1.39	0.2609	0.19	0.35
8/16/12	0.74	0.1286	0.17	0.33
8/17/12	1.05	0.1717	0.16	0.32
8/18/12	0.96	0.1782	0.19	0.34
8/19/12	0.63	0.103	0.16	0.32
8/20/12	0.62	0.1461	0.23	0.39
8/21/12	0.72	0.117	0.16	0.32
8/22/12	0.76	0.1935	0.26	0.40
8/23/12	0.92	0.2298	0.25	0.40
8/24/12	0.55	0.0895	0.16	0.32
8/25/12	0.81	0.2226	0.27	0.42
8/26/12	0.53	0.0755	0.14	0.30
8/27/12	0.67	0.1472	0.22	0.37
8/28/12	0.82	0.223	0.27	0.42
8/29/12	0.70	0.2178	0.31	0.45
8/30/12	0.64	0.1402	0.22	0.37
8/31/12	0.51	0.0864	0.17	0.33
9/1/12	0.47	0.0553	0.12	0.27
9/2/12	0.92	0.4298	0.47	0.55
9/3/12	1.11	0.2959	0.27	0.41

Day of the Year	Maximum velocity (m/s)	Total discharge (cms)	Area (m2)	Hydraulic Radius (m)
9/4/12	0.77	0.3306	0.43	0.52
9/5/12	0.66	0.0865	0.13	0.29
9/6/12	0.66	0.1657	0.25	0.40
9/7/12	1.12	0.1998	0.18	0.34
9/8/12	0.73	0.1689	0.23	0.38

Table 2: Seasonal variability of maximum diameter (meters) of sediment transport at different sloped regions of the LCG. Bedrock slopes from Lake to D-D', D-D' to C-C', C-C' to B-B', B-B' to A-A', A-A' to Toe are as follow, respectively: 0.222, 0.0492, 0.111, 0.0563, and 0.00372.

Day of the Year	Lake Linda to D-D' (m)	D-D' to C-C' (m)	C-C' to B-B' (m)	B-B' to A-A' (m)	A-A' to Glacial Toe (m)
7/5/12	11.99	2.66	5.99	3.04	0.20
7/6/12	12.02	2.67	6.01	3.05	0.20
7/7/12	13.01	2.89	6.50	3.30	0.22
7/8/12	13.99	3.11	6.99	3.55	0.23
7/9/12	13.55	3.01	6.77	3.44	0.23
7/11/12	14.11	3.13	7.05	3.58	0.24
7/12/12	11.57	2.57	5.78	2.94	0.19
7/13/12	17.26	3.83	8.63	4.38	0.29
7/14/12	16.81	3.73	8.40	4.26	0.28
7/17/12	12.54	2.78	6.26	3.18	0.21
7/19/12	13.35	2.96	6.67	3.39	0.22
7/20/12	14.10	3.13	7.04	3.58	0.24
7/21/12	14.49	3.22	7.24	3.67	0.24
7/22/12	11.69	2.59	5.84	2.96	0.20
7/23/12	13.61	3.02	6.80	3.45	0.23
7/24/12	13.80	3.06	6.90	3.50	0.23
7/25/12	12.18	2.70	6.09	3.09	0.20
7/26/12	12.94	2.87	6.46	3.28	0.22
7/27/12	15.68	3.48	7.84	3.98	0.26
7/28/12	13.78	3.06	6.89	3.49	0.23

Day of the Year	Lake Linda to D-D' (m)	D-D' to C-C' (m)	C-C' to B-B' (m)	B-B' to A-A' (m)	A-A' to Glacial Toe (m)
7/29/12	10.84	2.41	5.42	2.75	0.18
7/30/12	10.99	2.44	5.49	2.79	0.18
7/31/12	10.72	2.38	5.36	2.72	0.18
8/1/12	11.65	2.59	5.82	2.95	0.20
8/2/12	10.93	2.43	5.46	2.77	0.18
8/3/12	15.80	3.51	7.90	4.01	0.27
8/4/12	10.22	2.27	5.11	2.59	0.17
8/5/12	15.66	3.48	7.83	3.97	0.26
8/6/12	11.97	2.66	5.98	3.04	0.20
8/7/12	13.62	3.02	6.81	3.45	0.23
8/8/12	10.20	2.26	5.09	2.59	0.17
8/9/12	10.98	2.44	5.49	2.79	0.18
8/10/12	9.67	2.15	4.83	2.45	0.16
8/11/12	11.18	2.48	5.59	2.84	0.19
8/12/12	8.68	1.93	4.34	2.20	0.15
8/13/12	12.33	2.74	6.16	3.13	0.21
8/14/12	12.97	2.88	6.48	3.29	0.22
8/15/12	10.14	2.25	5.07	2.57	0.17
8/16/12	9.75	2.16	4.87	2.47	0.16
8/17/12	9.44	2.09	4.72	2.39	0.16
8/18/12	10.08	2.24	5.04	2.56	0.17
8/19/12	9.45	2.10	4.72	2.40	0.16
8/20/12	11.31	2.51	5.65	2.87	0.19
8/21/12	9.45	2.10	4.72	2.40	0.16
8/22/12	11.83	2.63	5.91	3.00	0.20
8/23/12	11.70	2.60	5.85	2.97	0.20
8/24/12	9.45	2.10	4.72	2.40	0.16
8/25/12	12.23	2.71	6.11	3.10	0.21
8/26/12	8.80	1.95	4.40	2.23	0.15
8/27/12	10.96	2.43	5.47	2.78	0.18
8/28/12	12.22	2.71	6.11	3.10	0.21
8/29/12	13.06	2.90	6.53	3.31	0.22
8/30/12	10.97	2.44	5.48	2.78	0.18

Day of the Year	Lake Linda to D-D' (m)	D-D' to C-C' (m)	C-C' to B-B' (m)	B-B' to A-A' (m)	A-A' to Glacial Toe (m)
8/31/12	9.63	2.14	4.81	2.44	0.16
9/1/12	8.05	1.79	4.02	2.04	0.14
9/2/12	15.98	3.55	7.99	4.05	0.27
9/3/12	12.06	2.68	6.03	3.06	0.20
9/4/12	15.34	3.41	7.67	3.89	0.26
9/5/12	8.49	1.89	4.24	2.15	0.14
9/6/12	11.76	2.61	5.88	2.98	0.20
9/7/12	9.90	2.20	4.95	2.51	0.17
9/8/12	11.24	2.49	5.62	2.85	0.19

Appendix 2: MATLAB codes

Sediment transport analysis of Lemon Creek Glacier, AK on 14-Nov-14 by Anna Clinger

%Calculate channel radius based upon seasonal discharge, max vel, and assumption

%that channels are semi-circular

Q=0.0283168 .* discharge(:,1); %convert metric

U=0.3048 .* max_vel(:,1); %convert to metric

A=Q./U; %Calculate area by discharge over max. velocity

R=sqrt(2*Q./(pi*U)); %Calculate radius assuming semi-circular shape

%Maximum d50 calculation across season. Slope data from Thiel et al. (1957)

%and surface ice elevations from USGS DEM

pw=1000; %density of water (kg/m^3)

g=9.81; %gravitational constant (m/s^2)

S=.069726; % average bedrock surface slope (m/m)

S_comp=(bedrock_slope)'; %creates vector of each slope along profile

bs=pw*g.*R*S; %boundary shear stress (N/m^2)

bs_comp=(pw*g.*R)*S_comp; %boundary shear stress along individual slopes

shields=0.045; %dimensionless shields parameter

ps=2650; %density of sediment using crustal average (kg/m^3)

d50=bs./(shields*(ps-pw)); %maximum grain size using average slope
d50_comp=bs_comp./(shields*(ps-pw)); %maximum grain size using the different %slope components
Plot the LCG watershed
%plot surface ice elevation and estimated bedrock depth of the LCG
x=distance; %defines excel variable as distance from Lake Linda in meters
v1=bedrock_elev; %defines excel variable as estimate bedrock elevation in meters
v2=ice_elev; %defines excel variable as surface ice elevation in meters
figure
plot(x,v1,x,v2,'k-'); %plot both variables over distance
xlabel('Distance from Lake Linda (m)') %label x-axis
ylabel('Elevation (m)') %label y-axis
title('Lemon Creek Glacier Watershed Profile') %Title graph
legend('Estimated Bedrock','Surface Ice') %Include legend

Appendix 3:

Polynomial Fit in Igor Pro with 6th degree fit so that: f(x) = K0 +K1x+K2x-^2+K3x^3+K4x^4+K5x^5+K6x^6
\Z12Coefficient values ± one standard deviation

K0	=388.82 ± 2.69e+03
K1	=-10.818 ± 61.7
K2	=0.11598 ± 0.566
K3	=-0.00060403 ± 0.00259
K4	=1.5378e-06 ± 5.9e-06
K5	=-1.5376e-09 ± 5.37e-09

Effect of variable reproductive output and connectivity on populations of a host fish and its bacterial symbiont, with implications for future climate change

Katherine Dougan

From Earth 333, The Inexhaustible Seas? Marine Resources and Environmental Issues (nominated Ingrid Henry)

Effect of variable reproductive output and connectivity on populations of a host fish and its bacterial symbiont, with implications for future climate change

ABSTRACT

The symbiosis between the coral reef cardinalfish *Siphamia tubifer* (previously *Siphamia versicolor*) and its bioluminescent symbiont, *Photobacterium mandapamensis*, provides a model system for examining the influence of host connectivity on the spatial distribution and concentration of bacterial symbionts. *S. tubifer* are nocturnal fish with strong homing capabilities and high self-recruitment of larvae to natal reefs. As ocean warming temperatures increase, connectivity and larval dispersal between populations of *S. tubifer* are expected to decrease, which will result in an increased reliance on self-recruitment in *S. tubifer* to maintain population abundances. This study determined the number and percentage of male brooders in *S. tubifer* samples collected from different populations around Okinawa and used male brooder percentages in the collected samples as a representation of the corresponding population's overall reproductive output. The results demonstrate that the amount of self-recruitment between *S. tubifer* populations might vary considerably due to the differing reproductive outputs for populations from various factors at each site. These factors can include but are not limited to site topography, chemicals, and coral diversity. An increased reliance on self-recruitment in a population with low reproductive output could potentially face adverse effects like an increased vulnerability to local extinctions when stressed. Populations with high reproductive outputs, however, might continue to thrive in spite of decreasing connectivity between populations. Together, the effects of different reproductive outputs could cause the spatial distribution of *S. tubifer* populations to change along with its symbiont should connectivity decrease due to ocean warming. The *S. tubifer*-P. mandapamensis symbiosis provides us an experimentally tractable and simplistic model to examine the implications of altered host spatial variation on bacterial symbiont dispersal and abundances.

INTRODUCTION

The coral reef apogonid *Siphamia. tubifer*, endemic to the Indo-Pacific, forms a very specific mutualistic symbiosis with the luminous bacterium *Photobacterium mandapamensis* (Tominaga, 1964). It is hypothesized that the host fish provides their symbionts with the oxygen and nutrients required for reproduction and bioluminescence while the bacterial symbiont produces light that is utilized by the host for vital nocturnal functions such as signaling, attracting prey, and avoiding predators (Hastings, 1971; Morin et al., 1975; Ruby and Morin, 1978; McFall-Ngai, 1983; McFall-Ngai and Dunlap, 1983).

S. tubifer are nocturnal fish that hide within the spines of *Diadema setosum* (sea urchins) for protection during the daytime, leave at dusk for foraging, and then use navigational cues for homing to return before dawn to the same reef, sometimes even the same urchin (Dunlap and Nakamura, 2011). *S. tubifer* have even demonstrated a significant homing capability to return to their home reef after a forced displacement of up to 2 km, suggesting the use of strong navigational cues like auditory cues (Gould, pers. comm., 2014). Furthermore, auditory cues have been implicated in paternal mouthbrooding apogonid species as cues for larval fish self-recruitment to natal reefs for settlement (Leis et al., 2003; Simpson et al. 2004, 2005).

As a paternal mouthbrooding fish, *S. tubifer* males incubate eggs in their buccal cavity for approximately one week while they develop into mature larvae that can be released (Breder and Rosen, 1966; Dunlap, et al. 2012). The buccal cavity in mouthbrooding male fish species imposes restrictions on reproductive output as fish must obtain a minimum length and corresponding buccal cavity size for mouthbrooding (Welcomme, 1967; Hess, 1993; Okuda et al., 1998). Therefore, determining the percentage of *S. tubifer* brooding males in a population could function as a way to measure the amount of reproduction and more specifically, larval release, occurring at a reef. This could, in turn, correspond to the degree of larval settlement the reef will experience through self-recruitment from its offspring due to their homing capabilities.

While there is considerable data to support the idea of high self-recruitment in *S. tubifer*, the presence of some long-range larval dispersal patterns(?) maintains connectivity between populations and in turn, protects populations from local extinctions (Sale, 1991). This connectivity is dependent upon the extent of larval dispersal between the populations, a factor that varies greatly among species (Kinlan and Gaines, 2003; Sale and Kritzer, 2003; Shanks et al., 2003). Larval dispersal is also affected by pelagic larval duration, or the period of time before larvae are recruited to a specific area, and the number of offspring produced, both of which are adversely affected by ocean warming (Cowen, 2002; James et al., 2002; Cowen et al., 2007; Gerlach et al., 2007; Leis, 2007).

If the degree of connectivity between *S. tubifer* populations is affected by ocean warming then the distribution of its symbiont *P. mandapamensis* could change as well. The routine defecation of *P. mandapamensis* along with fecal matter from *S. tubifer* results in increased local concentrations of its symbiont, especially at home reefs where *S. tubifer* is stationary during the day (Marnane, 2000). It is therefore likely that changes in the spatial distribution of *S. tubifer* due to ocean warming between reefs could similarly affect the spatial distribution and abundance of *P. mandapamensis*.

This study attempts to demonstrate that the presence of varying levels of reproductive output in populations of *S. tubifer* could signify different degrees of resistance to local extinctions, should connectivity between populations decrease due to ocean warming. Decreased connectivity between *S. tubifer* populations could result in an increased reliance on self-recruitment to maintain population abundances. This could cause increased spatial isolation of *S. tubifer* populations and probability of local extinctions when stressed due to their greater dependence on self-recruitment. The experimental tractability and simplicity of the *S. tubifer-P. mandapamensis* symbiosis provides a model system to examine how the range and distribution of microbes in marine symbioses, whether mutualistic or pathogenic, might transform under ocean arming conditions that alter their host population structures and connectivity.

RESULTS

The 13 sites sampled (Figure 1) showed a great amount of variation in the percentage of brooding males in the samples collected and in the relationship between sample mean length for the total population and percentage of brooding males within each sample (Table 1). The mean standard length for all male brooders collected (n=61) was 29.5 ± 0.4 mm. The percentage of brooding males within a sample increases with increasing sample mean length of all individuals collected at a site. No male brooders were present in samples collected at Cape Maeda, Henoko, Ikei Island, and Nanjo. Samples from these sites had sample mean lengths far below the mean length for male brooders collected throughout the course of this study.

In sample sites where overall mean lengths were comparable to the mean length for brooders in the study, there was variation in the percentage of male brooders. Motobu, Sesoko Island, and Nago had the highest mean lengths at 28.1 ± 4.2 mm, 27.1 ±4.9 mm, and 28.3 ± 6.1 mm, respectively, and displayed a high degree of variance in male brooder percentage. Motobu had the greatest percentage of male brooders at 42.1% followed by Sesoko Island with 33.3% and Nago with 12.5%. Itoman Harbor had a slightly lower mean length at 25.3 ± 4.0 mm, yet 17.9% of the sample consisted of male brooders, higher than Nago. Ada and Kouri also had similar mean lengths to Itoman Harbor at 26.1 ± 5.7 mm and 25.8 ± 4.6 mm, respectively, but male brooder percentages that were much smaller at 5.6% and 10.3%, respectively.

The number of eggs in *S. tubifer* brooding male clutches (n=35) increased as fish standard length increased. Linear regression analysis resulted in an R2 value of 0.4642 (Figure 2).

Table 1. The thirteen sites of S. tubifer sample collection with overall sample mean lengths, sample length range, brooder mean lengths, percentage of brooders in sample, and sample size. Standard deviations were calculated for sample mean length and brooder mean length.

Location	Sample Mean Length (mm)	Sample Length Range (mm)	Brooder Mean Length (mm)	% Brooders	Sample size (n)
Ada	26.1 ± 5.7	12.5 – 34.5	29.0 ± 1.4	5.6	36
Cape Maeda	18.9 ± 5.5	11.5 – 35.5	–	0.0	36
Cape Hedo	23.2 ± 7.1	13.5 – 37.5	29.7 ± 0.8	8.8	34
Henoko	16.7 ± 3.7	12.5 – 27.5	–	0.0	43
Ikei Island	15.0 ± 4.3	10.5 – 31.0	–	0.0	38
Itoman	19.5 ± 4.3	15.5 – 30.5	30.5 ± 0.0	4.5	22
Itoman Harbor	25.3 ± 4.0	18.5 – 36.5	29.5 ± 1.5	17.9	56
Kouri	25.8 ± 4.6	16.5 – 33.5	30.7 ± 2.5	10.3	29
Motobu	28.1 ± 4.2	19.0 – 35.0	29.1 ± 2.1	42.1	57
Nago	28.3 ± 6.1	18.5 – 42.5	29.8 ± 1.0	12.5	32
Nanjo	18.9 ± 2.3	15.5 – 25.0	–	0.0	33
Onna	23.2 ±4.9	15.5 – 32.5	29.0 ± 0.0	2.9	35
Sesoko Island	27.1 ± 4.9	14.0 – 38.5	28.9 ± 3.0	33.3	39

Figure 1. Okinawa Island. Dots represent locations of sample sites used in this study.

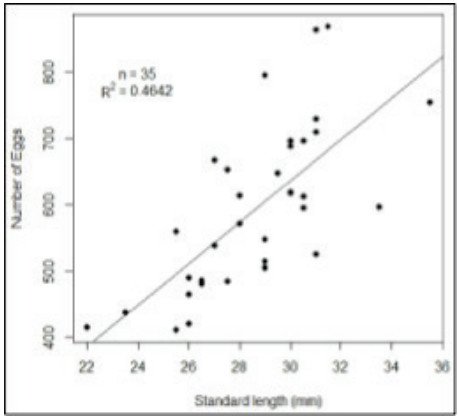

Figure 2. *S. tubifer* brooding males standard length and clutch size with a linear regression analysis.

DISCUSSION

The percentage of brooding males in the samples collected from *S. tubifer* populations varied greatly between different sites. Some sites contained no brooding males in the samples, suggesting no reproduction was occurring at the time of sampling. These sites included Cape Maeda, Henoko, Ikei Island, and Nanjo. Sample mean lengths from these sites are far below the overall mean length of 29.5 ± 0.4 mm of all samples for male brooders. This implies these populations contained a greater proportion of smaller, younger fish with males not yet capable of reproduction. While the age and size at which *S. tubifer* is sexually mature remains unknown, it is probable that these smaller fish required more physical growth or sexual maturation at the time of sampling. Therefore, they might not encounter a great degree of settlement by larval fish until they mature due to a lack of offspring and the subsequent self-recruitment back to their natal reef. While it is possible that larger *S. tubifer* fish could have been present at the reefs and not collected, it is unlikely as the reef was intensely explored for *S. tubifer* fish.

The Motobu, Sesoko Island, and Nago samples had the highest sample mean lengths at 28.1 ± 4.2 mm, 27.1 ±4.9 mm, and 28.3 ± 6.1 mm, respectively, yet varied considerably in terms of reproductive output. Motobu had the greatest percentage of male brooders in the samples at 42.1% followed by Sesoko Island with 33.3% and Nago with 12.5%. One factor that might account for this significantly increased reproductive output in the Motobu *S. tubifer* population is chemical differences in the water. The Motobu collection site is situated directly offshore from the Okinawa Prefectural Sea Farming Center release location of nutritionally-enriched and hormonally-enriched water into the ocean (Fushimi, 2001, Ostrowski and Laidley, 2001). The gonadtropic hormones present in this enhanced water stimulate the production of sex hormones testosterone and estrogen, in addition to expediting sexual maturation in fish (Ostrowski and Laidley, 2001). This influx of both nutrient and hormone enhanced water is likely fostering both faster and an increased amount of sexual development and

reproduction and therefore creating a higher percentage of *S. tubifer* brooding males at the Motobu site than might normally occur. This should result in a high degree of recruitment and settlement to this site by larval fish due to the large numbers of offspring produced here. This was also evident at the site as an additional 357 *S. tubifer* fish were collected at this site for a related study, the highest number of fish seen at an site by more than 200.

The Sesoko Island and Nago samples displayed similar mean lengths, yet the Sesoko Island sample contained almost three times as many brooding males as the Nago sample. This is likely due to differences in coral structure and diversity between the two collection sites. Many studies have connected increased coral cover, coral diversity, and topographical complexity on a reef to greater fish biodiversity and abundance (Risk, 1972; Luckhurst and Luckhurst, 1978; Bell and Galzin, 1984; Sano et al., 1984; Chabanet et al., 1997; Syms and Jones, 2000; Munday, 2004; Bozec et al., 2005). The Sesoko Island collection site was a diverse coral reef with a large degree of coral cover and topographical complexity providing abundant habitats and substantial protection. On the contrary, the Nago site was a flat sandy bottom with a few scattered coral heads contributing little physical cover for protection from predation. It could be speculated that reefs similar to Sesoko are more propitious for *S. tubifer* than those like Nago as populations might be more resistant under stress due to advantageous reef structure that supports greater reproductive output and heightened recruitment and settlement from offspring.

Itoman Harbor had a slightly lower mean length at 25.3 ± 4.0 mm, yet 17.9% of the sample consisted of male brooders, higher than Nago. Itoman Harbor lacked coral structures but the ocean floor was covered by groups of boulders that to an extent imitated the structure of a coral reef. Large aggregates of *D. setosum* were also found here along with high abundance and biodiversity of fish. The boulders appeared to maintain the topographical complexity found on coral reefs and might account for the increased percentage of *S. tubifer* brooding males at this site compared to Nago despite the lack of coral cover. Ada

and Kouri also had similar mean lengths to Itoman Harbor at 26.1 ± 5.7 mm and 25.8 ± 4.6 mm, respectively, but male brooder percentages that were much smaller at 5.6% and 10.3%, respectively. These sites were only sparsely populated by corals and mainly consisted of either sea grass or sand flats, leaving few adequate habitats for *S. tubifer*. These two populations, with their lower degrees of potential *S. tubifer* larval self-recruitment due to small reproductive output, may be more susceptible to disturbances and stress.

The number of eggs in *S. tubifer* brooding male clutches was shown to increase with increasing fish standard length, likely due to larger buccal cavities in larger males. Linear regression analysis resulted in an R2 value of 0.4642 (Figure 2), suggesting brooding male fish size plays a role in influencing reproductive output, but is not the sole factor affecting it. Another element implicated in shaping reproductive output is female size, as larger females are more fecund and produce more robust offspring (Heath and Blouw, 1998; Einum and Fleming, 1999). Furthermore, studies of other paternal mouthbrooding cardinalfish species have indicated females will adjust egg size production based upon the size of the male they mate with; larger males will receive larger eggs compared to their smaller counterparts (Kolm, 2001). Larger egg production has been linked to larger offspring with higher growth and survival rates in many different species of fish (Heath and Blouw, 1998; Einum and Fleming, 1999). This further supports the idea for using *S. tubifer* brooding male mean sizes and percentages for a collected sample as a representation of the potential reproductive output for that entire population.

Self-recruitment and reproductive output are essential components in replenishing a population and maintaining species abundance in species like *S. tubifer* (Sweatman, 1988; Forrester, 1999). There is increasing data that suggests small populations about a few kilometers apart can be mainly supported by self-recruitment (Jones et al., 1999; Swearer et al., 1999; Hughest et al., 2000), suggesting that reproductive output by a population could be the most imperative component in the replenishment and maintenance of local populations.

S. tubifer populations in areas of lower reproductive output, like Ada and Kouri, are likely to be less resistant to stress events that deleteriously affect their reproductive output. Connectivity and larval dispersal between populations is present to a certain extent, however more isolated populations, as is the case here with *S. tubifer*, are expected to experience a higher degree of self-recruitment (Jones et al., 2009). At the same time, this high degree of self-recruitment in *S. tubifer* does not automatically equate to the populations being self-sustaining and not reliant to some extent on connectivity with other populations (Botsford et al., 2009).

It is believed, however, that global warming will adversely affect the connectivity between fish populations. Even small changes in temperature have the potential to change current biological patterns and processes (Munday et al., 2008). Fish are especially susceptible during reproduction and at the larval stage to temperature fluctuations as it both speeds up their development and decreases the amount of reproduction (Wood and McDonald, 1997). This is a potentially serious implication as these two factors are central to maintaining population connectivity in species like *S. tubifer*.

Whether or not *S. tubifer* will be negatively affected appears to also be partially dependent on nutrient abundance (Jones and McCormick, 2002). Higher nutrient abundance might enable fish to offset the negative effects of higher temperatures while lower concentrations of nutrients will result in adverse effects on fish reproduction and early life stages, and eventually decreased connectivity. In species like *S. tubifer*, this could have severe consequences on abundance and spatial distribution. Some nutrient-rich sites, like Motobu, might maintain their *S. tubifer* populations and not be affected by ocean warming conditions. However, other sites, like Ada and Kouri Island, that contain less nutrients and low reproductive outputs might experience decrease in abundance, become more vulnerable to stressors, and even face local population extinctions.

Understanding how ocean warming could affect the abundance and spatial distributions of smaller coral reef fish through decreased connectivity and

an increased reliance on self-recruitment, could lead to improvements in coral reef species preservation. Although sometimes overlooked, smaller benthic fish such as *S. tubifer* play an important role in maintaining balance in the coral reef ecosystem. Greater understanding of areas where species like *S. tubifer* are more vulnerable under ocean warming conditions could also lead to improved selection of marine protected areas.

Furthermore, understanding the connectivity and recruitment dynamics of *S. tubifer* coupled with the distribution of its luminous symbiont *P. mandapamensis* can improve our knowledge of how host dynamics could in turn affect spatial distribution and concentration of both beneficial and potentially pathogenic microbial symbionts. This could have important implications on other marine symbioses that are not as physically accessible and experimentally tractable as the *S. tubifer-P. mandapamensis* symbiosis. Future studies should determine the concentration of *P. mandapamensis* in relation to different populations of *S. tubifer* to begin to elucidate specifics in the relationship between this host and its symbiont in regards to spatial variation and concentration.

CONCLUSION

This study investigated how the future population abundance and distribution of *S. tubifer* might change under ocean warming conditions due to varying reproductive outputs in conjunction with high self-recruitment patterns between different populations. This was then used to predict how warming ocean temperatures that change the distribution of a host fish might likewise affect the distribution and abundance of its bacterial symbiont.

Samples displayed variability in percentage of brooding males and mean standard lengths between different populations in different reefs. Since the amount of mouth brooding males present is representative of the amount of self-recruitment a population will experience, populations with higher self-recruitment will be more stable under ocean warming conditions that will decrease larval dispersal between populations.

In populations of fish that display a strong preference for self-recruitment and have symbiotic relationships with bacteria, like *S. tubifer*, understanding more about how these populations will change will increase our understanding of how symbiotic microbial assemblages, whether they be mutualistic or pathogenic, might likewise evolve. This provides the foundation for future studies to determine trends in distribution and abundance between the host fish *S. tubifer* and its microbial symbiont *P. mandapamensis*, and to interpret the implications this has on other marine hosts and their symbionts.

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Winning Essays
Granader Prize for Excellence in Upper-Level Writing (social sciences)

Detroit Bankruptcy and Redistribution

Grace Judge
From PolSci 381, Political Science Research Design
(nominated by Mika LaVaque-Manty)

In every step of our scaffolded assignment process, Grace was ahead of the game. For example, for her annotated bibliography, she submitted a piece that would have satisfied the next, more demanding literature review assignment. This reflected her ability to understand the nature of the research proposal brilliantly. Most impressive, however, was Grace's ability to develop an original, sophisticated research proposal that combines her deep normative interest in the politics of inequality with several demanding social-scientific methods (game-theoretic modeling, quantitative and qualitative empirical analysis) and to write about all of this clearly, succinctly, yet beautifully..

Mika LaVaque-Manty

Research Proposal: The Detroit Bankruptcy and Redistribution

Introduction

Last month, Judge Steven Rhodes approved the City of Detroit's Plan of Adjustment, bringing to a close the largest municipal bankruptcy case in United States history. Insofar as it appears the outcome of the Detroit case will lead to downward economic redistribution, I hope to identify the aspects of this specific case that allowed redistribution to occur. This inquiry is particularly significant given that the larger American political system seems chronically resistant to efforts to downwardly redistribute wealth and income, despite rising economic inequality. There has been a notable scholarly effort in recent years to explain this trend, with the focus of scholarship largely on national politics. Drawing from the work of political scientists who argue that studies on sub-national politics have the potential to offer new answers to questions that apply more generally to the national political stage,[1] I believe that identifying the components of the Detroit bankruptcy case that brought about a rare instance of downward redistribution could have implications for the larger study of redistribution and inequality in the American politics.

Redistribution can take many different forms in political economy, from tax codes and welfare programs to labor market regulation. In bankruptcy, redistribution occurs through what Thomson identifies as "the central problem of bankruptcy:" when a debtor's assets, *E*, must to be divided among a set of creditors with claims summing to more than *E*.[2] Given that *E* is a fixed amount, when these assets are divided, no creditor is made better off except at the expense of another creditor. In other words, bankruptcy is a "zero-sum" or Pareto optimal system. Therefore, the choice of one division of *E* over all other possible divisions effectively represents the transfer of wealth between creditors as the

[1]Jessica Trounstine, "All Politics Is Local: The Reemergence of the Study of City Politics," *Perspectives on Politics* 7, no. 3 (September 2009): 611–18.
[2]William Thomson, "Axiomatic and Game-Theoretic Analysis of Bankruptcy and Taxation Problems: A Survey," *Mathematical Social Sciences* 45, no. 3 (July 2003): 249–97.

bankruptcy outcome moves across the Pareto frontier. Thus, all outcomes of bankruptcy lead to redistribution between creditors. For my study, the relevant questions then become: in bankruptcy, is the final division of assets *downwardly* redistributive, and, if so, how and why was this specific division chosen?

As case studies of redistribution, bankruptcy trials are useful because the formality of the process described above makes it relatively easy to identify data relating to questions of downward redistribution. In the particular case of Detroit, the goal of the Chapter 9 bankruptcy litigation was to ratify a division of the municipal assets with the consent of the city and its creditors (or at least a sufficient portion of creditors). The fact that this was a legal process regulated by federal bankruptcy court insures that official actors, outcomes, and actions - by way of negotiations and mediations - were precisely recorded and, for the most part, made public through the Plan of Adjustment and other legal documents. For this reason, I believe the data available to me to answer questions of if and how downward redistribution occurred in the Detroit case will be both rich and relatively easy to obtain.

Review of Literature

Coinciding with the steady rise in economic inequality since the 1980s, there is a growing body of academic work addressing the failure of the American political system to redistribute wealth and income on a federal level. A significant portion of this work looks at the role of public opinion in shaping redistributive policies. There are two major theories on public opinion and redistribution that most of these sources address. The first is the "Downsian model" for political decision-making which is based on a "Public Choice" tradition of applying of economic theory to non-market political science problems.[3] Specifically, Downs predicts two political outcomes in democracy using economic principles: first, if every person in a political system is given one vote, redistributive policies are likely to ensue; and second, vote-maximizing politicians in two-party systems

[3]Anthony Downs, *An Economic Theory of Democracy*, (New York, Harper and Brothers, 1957).

have rational incentives to converge on the preferences of the median voter in order to win elections. The second is a standard political economy model of redistribution from Meltzer and Richard which suggests that inequality and the demand for redistribution should be positively linked, meaning that higher levels of inequality should lead to a greater demand for redistribution.[4]

Scholarship from the past two decades has grappled with these theories, testing their predictive power through empirical data analysis. The vast majority have demonstrated that, contrary to these two models, there is a negative correlation between pre-transfer inequality and redistribution. A study by Kelly and Enns models the effect of inequality on preferences while controlling for other theoretically relevant variables, ultimately finding that all classes become more conservative as the level of inequality increases.[5] Lupu and Pontusson, in a similar study, find that the *structure* of inequality is more relevant than the *level* of inequality, but nevertheless corroborate the negative correlation between inequality and redistribution.[6] Specifically, they define the structure of inequality as the relative distribution of income across classes, which they believe drives public opinion on redistribution.[6] Luttig confirms the results of both Kelly-Enns and Lupu-Pontusson, arguing that both the absolute level and the changing structure of inequality have promoted conservatism, as opposed to liberal redistributive policies.[7] Franko, Tolbert, and Witko add to this body of scholarship by studying a rare instance of a proposal to actually raise taxes on the wealthy - Washington State's Proposition 1098 – as opposed to proposals which seek to cut taxes on the rich, which are more often the subject of this research.[8] The fact

[4]Allan Meltzer and Scott Richards, "A Rational Theory of the Size of Government," *Journal of Political Economy* 89, no. 5 (October, 1981): 914-927.
[5]Nathan Kelly and Peter Enns, "Inequality and the Dynamics of Public Opinion: The Self-Reinforcing Link Between Economic Inequality and Mass Preferences," *American Journal of Political Science* 54, no. 4 (October, 2010): 855–70.
[6]Noam Lupu and Jonas Pontusson, "The Structure of Inequality and the Politics of Redistribution," *American Political Science Review* 105, no. 02 (May 2011): 316–36.
[7]Matthew Luttig, "The Structure of Inequality and Americans' Attitudes Toward Redistribution," *Public Opinion Quarterly* 77, no. 3 (Fall 2013): 811–21.
[8]William Franko, Caroline J. Tolbert, and Christopher Witko, "Inequality, Self-Interest, and Public Support for 'Robin Hood' Tax Policies," *Political Research Quarterly* 66, no. 4 (December 2013): 923–37.

that this proposal was not passed, they argue, corroborates the conclusions of these previous studies that the Downsian and Meltzer-Richard models do not hold in real-world contexts.

There is also a significant body of literature which seeks to explain the results of these empirical studies on public opinion, and to understand why the American political reality seems to differ from theoretical predictions. One explanation put forth by Kearns et al, for example, looks at the residential and spatial determinants of public support for redistribution.[9] The researchers ask "whether where someone lives bears any association with their attitudes on inequality and income redistribution." They find that people with higher incomes showed greater support for redistribution when they lived in areas that were more deprived, had a higher density, and were more ethnically mixed. Patterns of residence, therefore, can be said to reinforce patterns of income and wealth inequalities through public opinion.

Other authors, such as Bartels, speculate that problems of information and voter competency are at fault.[10] Bartels uses Bush Era Tax Cuts as a case study of the "irrationality" of American voters, focusing in particular on the disconnect between voters' ideological values relating to the economy and their support for this specific tax policy, as well as the general latitude such disconnects affords political elites. Why is it, he asks, that middle and lower class voters who oppose inequality and believe the wealthy are not taxed enough supported the Bush Tax Cuts - which many of the same voters acknowledged would disproportionately benefit the wealthy. Bartel's solution – that "the appealing notion of popular sovereignty is both psychologically unrealistic and logically incoherent" – is two-part: first, many voters simply ignored the issue; second, those who had an opinion based their views on their own tax cut over their

[9]Ade Kearns, Nick Bailey, Maria Gannon, Mark Livingston, and Alastair Leyland, "'All in It Together'? Social Cohesion in a Divided Society: Attitudes to Income Inequality and Redistribution in a Residential Context," *Journal of Social Policy* 43, no. 3 (July 2014): 453–77.
[10]Larry Bartels, *Unequal Democracy: The Political Economy of the New Gilded Age*, Princeton University Press, 2009.

larger economic interest and values. Bartels concludes that public opinion is not an impetus for tax policy, but rather a resource to be shaped.

Alesina and Glaesar argue the American political system is much more resistant to redistribution because, in large part, of the history of racial stratification in the United States.[11] In their discussion of race, Alesina and Glaesar argue that the historic overlap between race and class in the United States has made it easier for politicians to stigmatize the poor as inherently "different" or "lesser" in order to avoid redistribution policies. Jacobs and Helms, like Alesina and Glaesar, focus on race in the United States in their explanation for the lack of redistribution.[12] Specifically, through analyzing "historically-contingent" changes in the progressivity of United States income tax code, they find that civil rights activity leads to redistributive tax policies, but social problems blamed on the underclass - such as riots or crime - reduce the progressivity of the tax code.

Finally, an article by Brady, Verba, and Schlozman uses survey data on electoral participation through voting, campaign work, and campaign contributions to add to Downs' portrait of median voter.[13] They find that the Downsian Model is predictive when the median voter is defined by relative political participation, as well as ideology. This is due to the practical necessities of running and funding campaigns which encourage candidates to be more responsive to those voters who are more likely to volunteer their time or donate. Rational politicians, therefore, attempt to woo voters who are more politically active, as well as the ideological centrist, and thus do not converge precisely on the ideologically median voter, but preference more active citizens. Because income levels are higher for participators than for the general population, they argue, politicians will favor policies that are minimally redistributive.

Other accounts of the lack of redistribution at the federal level look to

[11]Alberto Alesina and Edward Glaeser, *Fighting Poverty in the US and Europe: A World of Difference*, Oxford UK: Oxford University Press, 2004.
[12]David Jacobs and Ronald Helms, "Racial Politics and Redistribution: Isolating the Contingent Influence of Civil Rights, Riots, and Crime on Tax Progressivity," *Social Forces* 80, no. 1 (September 2001): 91–121.
[13]Henry Brady, Sidney Verba, and Kay Schlozman, "Redistribution, Polarization, and Medians: Bringing Data to Downsian Puzzles," *Conference Papers -- American Political Science Association*, January 2009, 1–52.

institutions, rather than public opinion, for explanation. Similar to the works of Alesina and Glaesar, Pontusson evaluates the distribution of wealth and income in the United States using a comparison between the US and other capitalist economies (specifically, Europe).[14] Pontusson agrees with these other authors in acknowledging that the United States has comparatively high levels of inequality, but differs in their explanations for why this is, focusing on comparative institutional structure rather than on public opinion. Specifically, Pontusson identifies three key institutional features that distinguish social market capitalism of Europe and the American style liberal market capitalism, including: organized business, collective bargaining between employers and unions, and extensive public provision of social welfare and employment protection. In the United States, he argues, limited coordination between firms and less powerful unions reduce the overall level role of collective bargaining in determining the distribution of gains from growth. This tends to favor business interests and contribute to a more unequal distribution of wealth.

Levy and Temlin also use a comparison to study the role of institutions in shaping economic distribution, but through cross-time comparisons of the United States' political economy as opposed to cross-national.[15] Levy and Temlin evaluate the role of institutions in shaping inequality by contrasting conditions in the US since 1980 to those from the postwar years. Early postwar years were characterized by progressive taxes and a high minimum wage - policies which broadly distribute gains from growth - whereas more recent years show markedly more concentrated distribution from these gains. They argue that this is difference is due to the contrasting institutional structures of these eras - the postwar landscape was shaped by unions and a negotiating framework set in the Treaty of Detroit, while recent decades have been defined by an institutional pattern known as the Washington Consensus. The focus in this paper is less on the

[14]Jonas Pontusson, Inequality and Prosperity: Social Europe vs. Liberal America, Cornell Studies in Political Economy. Ithaca, NY: Cornell University Press, 2005.
[15]Frank Levy and Temlin, Peter, "Inequality and Institutions in 20th Century America," Vol. 07. Industrial Performance Center, MIT, Working Paper Series, 2007.

re-distribution of wealth and income post tax and transfer, but on the pre-tax and transfer distribution of gains from growth.

Beramendi and Rueda similarly study the relationship between institutions and distribution, but from the opposite perspective – instead of asking how institutions shape distribution, they study how inequality shapes institutions.[16] Income inequality, they argue, must be taken into consideration at the time of negotiation of the original centralization agreements as an explanatory factor of institutional differences between countries. In particular, they look at the role inequality itself plays in the outcome wage bargaining centralization negotiations. Beramendia and Rueda develop a theory that high levels of inequality undermine the political feasibility of collective bargaining coordination in the labor market, testing their theory against its competing hypothesis using data from eleven OECD countries. They find that higher levels of inequality exacerbate conflict over resources between firms and promote opposing redistribution and institutional preferences within firms.

Hacker and Pierson attempt to identify the institutional causal forces behind low levels of redistribution in the United States by responding to the same "Downsian Puzzle" put forth by researchers focused on public opinion.[17] To do this, they take a broad political-economy approach, looking at how changes in the American political landscape have created a "winner take all" pattern of economic growth. They argue that prevailing political theories focus too narrowly on tax policy and the median voter. Instead, Hacker and Pierson advocate an analysis focused on organized group influence on the "market conditioning" policies of the government through lobbying efforts. Hacker and Pierson rely on the concept of political "drift" and its role in this process. They define drift as the failure of politicians to update policies due to pressure from political interest groups, despite the recognition that the effect of these policies

[16]Pablo Beramendi and David Rueda, "Inequality and Institutions: The Case of Economic Coordination," *Annual Review of Political Science* 17 (June 2014): 251–71.
[17]Jacob Hacker and Paul Pierson, "Presidents and the Political Economy: The Coalitional Foundations of Presidential Power," *Presidential Studies Quarterly* 42, no. 1 (March 2012): 101–31.

has changed substantially due to shifts in surrounding economic or social contexts, "drifting" away from their original intent. Encouraging political drift, they argue, is a key way American legislative institutions are shaped in ways that give unequal influence to business interests, resist redistribution, and allow inequality to rise.

A forthcoming study by Giles and Page builds off of Hacker and Pierson's thesis, testing the policy influence of different actors in the American system with a single statistical model, using multivariate analysis to demonstrate that economic elites and organized groups representing business interests have significant independent influence on American policy, while average citizens and their mass-based interest groups have little to none.[18] Giles and Page look at key variables for 1,779 policy issues, relating group preference on different policies to the success rate of said policies (whether or not the proposed policy change occurred in four years). This relationship is expressed through a "predictor," which measures the influence of group preference on outcome on a scale of 0 to 1; for average citizens, this number was 0.05, whereas for business interest groups it was 0.43 and for economic elites it was 0.78. Based on this evidence, Martin and Page conclude that both economic elites and organized interest groups, play a substantial part in affecting US policy, whereas the general public has little to no independent influence.

The body of work described thus far holds important insights into the political and economic factors that shape redistribution in America; however, it focuses exclusively on federal policy. In order to begin to think about how federal policy fits into urban redistribution, it is helpful to consider recent scholarship on municipal and state fiscal budgetary policies, which provides a framework for thinking about the political relationship between local and national economies. Up to the 1980s, it seems, the study of the politics of city budgeting settled on the conclusion that urban budgeting was a highly stable policy arena. Chal-

[18]Martin Giles and Benjamin Page, "Testing Theories of American Politics: Elites, Interest Groups, and Average Citizens," *Perspectives on Politics*, forthcoming Fall 2014.

lenging these assumptions, authors Kantor and David describe a new, turbulent climate for cities: fiscal crises, illegal deficits, new groups demanding public services, severe retrenchment, emergency bail-outs, etc.[19] In light of these findings, they propose a new analytical framework for city politics, identifying two features of the American political economy that affect city budgeting. The first is the inability of cities to regulate capital movements or immigration, which leads to inter-city rivalry for people and wealth and makes cities highly vulnerable to the winds of economic change and federal policy. Second, to address this turbulence, the municipal budgetary arena is used as a means to generate political stability, support, and dissuade relocation of residents and business is variable to the demands of city groups.

Peck builds on the analytic framework of Kantor and David's first argument, examining how the financial crisis of Wall Street in 2008 has been translated into a state crisis, especially for the state at the subnational and urban scale.[20] He frames austerity politics, referred to as "fiscal federalism," as a sustained effort to socialize, rescale, and 'dump' costs of the economic crisis onto states and cities, remaking the landscapes of urban politics. In particular, Peck identifies a key tension causing strain on states and cities: that the Keynesian commitment to public services in the United States is almost entirely delivered at the state or local level, while the neoliberal platform at the federal level pushes restraints on social spending, developing government employment, devolving budgets, and deferring to market conditions. This creates, he argues, cyclical financial distress. Budget crises trickle down while at the same time balanced-budget requirements are placed on states, localizing budget pressure. Most states are forced to reduce services and retrench public-sector workers. Ultimately, this system is self-perpetuating because deficit conditions systematically favor anti-state forces.

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[19]Paul Kantor and Stephen David, "The Political Economy of Change in Urban Budgetary Politics: A Framework for Analysis and a Case Study," *British Journal of Political Science* 13, no. 3 (July 1, 1983): 251–74.
[20]Jamie Peck "Pushing Austerity: State Failure, Municipal Bankruptcy and the Crises of Fiscal Federalism in the USA," *Cambridge Journal of Regions, Economy & Society* 7, no. 1 (March 2014): 17–44

One of the most pressing fiscal crises facing local political bodies is the looming threat of underfunded pensions.[21] Authors who seek to explain how this crisis developed also address Kantor and David's second argument, studying how municipal fiscal decisions are often made to appease voters and interest groups and insure political stability. Kelley, for example, applies a "Public Choice" approach to the pension problem using three models: the ubiquitous Downsian Model, the theory of "capture" by special interest groups, and a hybrid of the two.[22] He uses data from the Public Pension Database on pension liabilities and assets, comparing these points to voter data (income, age) and interest statistics (public union percent of voting population). The median voter, he speculates, would want to push the costs to the future, and the "special interests" - the public sector unions – would want to maximize the short-term compensation packages. Kelley ultimately finds that the combined model provides the strongest explanation, suggesting both voter preferences and interest groups affect outcomes.

In thinking about how the relevant phenomena covered thus far – public opinion, interest groups, institutions, and fiscal federalism – it is useful to consider how these factors are mitigated by the legal framework of Chapter 9 bankruptcy law. Because Judges Rhodes was granted enormous power in shaping the bankruptcy outcome, a discussion of judicial decision making is relevant. Much of this literature uses either a "behavioral" model to assess the impact of judges' personal attributes and backgrounds on their decision making, or an "attitudinal" model to argue that it is the judge's ideology which influences their choices.[23] Collins builds from this attitudinal framework, exploring how a judges' ideology combines with external political factors to produce outcomes.[24]

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[21]Robert Novy-Marx and Joshua Rauh, "The Liabilities and Risks of State-Sponsored Pension Plans," *Journal of Economic Perspectives* 23, no. 4 (November 2009): 191–210.
[22]Dashle Kelley, "The Political Economy of Unfunded Public Pension Liabilities," *Public Choice* 158, no. 1–2 (January 1, 2014): 21–38.
[23]Michael Heise, "Past, Present, and Future of Empirical Legal Scholarship: Judicial Decision Making and the New Empiricism, The." *University of Illinois Law Review* 2002 (2002): 819.
[24]Paul Collins Jr, *Friends of the Supreme Court: Interest Groups and Judicial Decision Making*, Oxford University Press, 2008.

Using empirical evidence on amicus curiae briefs, he propose a new "Legal Persuasion Model," which predicts that a judge will be influenced by the ideological content of legal briefs in a case irrespective of his or her own political proclivity.

Rather than studying judges as individuals, the decision making scholarship on bankruptcy proceedings in particular has largely attempted to analyze the considerations implicit in bankruptcy law, which judges are presumed to embody. Jackson and Scott, for example, propose a model that suggests that the various objectives which shape the distributional goals of bankruptcy are consistent with the goal of maximizing expected creditor group welfare.[25] In order to do this, the judged must understand distributional effects of bankruptcy as a "bankruptcy tax" imposed upon creditors in the collective proceedings, which must be fixed and horizontally equitable to avoid collective action problems. Korobkin disputes the welfare-based theory of bankruptcy put forth by Jackson and Scott, arguing that bankruptcy law does not merely exist for the purpose of maximizing the economic welfare of creditors as a group.[26] Rather, he argues, it is a response to a crisis of diverse human values that cannot be reduced to the objectivity and certainty of economic models. Korobkin proposes that bankruptcy decision making be understood as analogous to individual decision making about a person's life in that the normative and deliberative constraints of bankruptcy law allow judges to make rational decisions within the complex context of the case.

Other legal scholars have focused on the role of interest groups in shaping bankruptcy outcomes. Levitin, for example, argues Chapter 9 is a dynamic "armistice line" between competing groups.[27] He conceptualizes bankruptcy as a fundamentally a distributional exercise that is an expression of norms and interest group politics rather than an exercise in economic efficiency (Jackson

[25]Thomas H. Jackson and Robert E. Scott, "On the Nature of Bankruptcy: An Essay on Bankruptcy Sharing and the Creditors' Bargain," *Virginia Law Review* 75, no. 2 (March 1989)
[26]Donald Korobkin, "Value and Rationality in Bankruptcy Decisionmaking," *William & Mary Law Review* 33, no. 2 (February 1, 1992): 333.
[27]Adam Levitin, "Bankrupt Politics and the Politics of Bankruptcy," *Cornell Law Review*, September 2012.

and Scott would argue). In Levitin's opinion, bankruptcy mitigates the problem of fiscal federalism and is likely to be used to provide judicial cover for partisan agendas. He also describes bankruptcy as a political-discipline mechanism, a way for deals that are opposed by constituents to take place, and a tool to balance the budget through cut to employees' pensions, services, benefits, but not through tax increases.

Moringiello refocuses the discussion of bankruptcy as bringing together two sovereigns, the state and the federal government, to accomplish something that neither could accomplish on their own - a plan to adjust debts that is binding to all creditors.[28] In response to Levitin's description of the ways in which bankruptcy can be used for political purposes, Moringiello argues that bankruptcy is a political tool, but not in the way these he suggests. Specifically, it is a "wake-up call" to state officials who have paid little attention to their state's authorization statutes, deal with the deficiencies in the municipal distress intervention program. He argues that recent filings challenge the conventional wisdom that Chapter 9 is poorly tailored to the rehabilitation needs of cities, arguing that Levitin's approach was flawed because it looked at state intervention in municipal affairs and bankruptcy as freestanding alternatives rather than complementary components of a comprehensive recovery plan. Understanding and conceptualizing the character of bankruptcy law, it seems, is essential for determining the role that previously identified political factors (public opinion, interest groups, fiscal federalism, etc) played in shaping the redistributive outcome.

Finally, given that my contribution to this scholarly discussion of inequality is based on an assertion that redistributive phenomenon which occur on a sub-national level are relevant to a broader study of inequality, I will conclude with a brief discussion of the rigid boundary between political science and the sub-field of urban political studies identified by Sapotichne, Jones, and Wolfe

[28]Juliet Moringiello, "Goals and Governance in Municipal Bankruptcy," *Washington and Lee Law Review* 71, no. 1 (Winter 2014).

through a systematic analysis of journal citations. Sapotichne et al identify 18 different journals in both "mainstream" political science and the urban politics subfield, analyzing their citation patterns in terms of which academics and which topics were published in each, concluding that there is very little academic dialogue between the two and attributing this to the insularity of both fields.[29]

Troustine affirms Sapotichne et al's conclusion that urban politics has become estranged from the political science discipline and offers three arguments for why political scientists should revisit the study sub-state politics.[30] First, she argues, local-level political outcomes represent a huge portion of political events in the United States (and the world). Second, there are methodological advantages to studying local politics. Here, Troustine mentions insightful conclusions drawn in important works such as Robert Dahl's *Who Governs?* and Peter Bachrach and Morton Baratz's "Two faces of power," arguing that these authors used rich data sets from specific cities to extrapolate conclusions that were far-reaching and important. Finally, Troustine argues, studying urban politics can generate new questions and offer different answers to questions that apply more generally to national-level political phenomenon.

Conceptual Model

In his work on the axiomatic and game-theoretic properties of bankruptcy, Thomson conceptualizes the outcome of bankruptcy as being determined by what he calls a "Divisor Rule."[31] An adapted representation of his conceptual model is shown below,

$$A_x = Divisor\ Rule\ (E)$$

where E represents insufficient debtor assets (as described in the introduction) and A_x represents the amount of debtor assets awarded to some creditor "x" as determined by the Divisor Rule.

I argue that the greatest weakness of this approach is that it

[29]Joshua Sapotichne, Bryan Jones, and Michelle Wolfe, "Is Urban Politics a Black Hole? Analyzing the Boundary between Political Science and Urban Politics," *Urban Affairs Review* 43, no. 1 (2007): 76–106.
[30]Trounstine, "All Politics Is Local," 617.
[31]Thomson, "Analysis of Bankruptcy," 261.

conceptualizes Chapter 11 corporate bankruptcy law, whereas the Detroit case will be determined by Chapter 9 municipal bankruptcy law. The most important distinction between the two is that Chapter 11 allows for the total liquidation or debtor assets for distribution among creditors, whereas municipal bankruptcy law is explicitly designed to protect financially-distressed cities from liquidation. In practice, this means that the city may decide how to use its assets, balancing the absolution of debt through the liquidation of assets with long-term considerations on the future value of those assets for the city.

Consequently, a conceptualization of bankruptcy distribution in the Detroit case must take into account the interests of the creditor (city residents and representatives) in assessing the actions and behaviors that inform outcomes. If debtors retain control over which assets are available to their creditors, the funds available for distribution are also subject to negotiation through what I propose is the "Asset Rule:"

$$E_2 = Asset\ Rule\ (E_1)$$

where E_2, the value of assets available to creditors, is a function of E_1 , the total value of debtor assets, defined by the Asset Rule. A_x can now be understood as:

$$A_x = Divisor\ Rule(Asset\ Rule(E_1))$$

where distribution is determined and measured by a composite function of E_1 characterized by the Divisor and Asset Rules. This conceptual model allows me to focus and modify my research question to ask: if the Divisor and Asset Rules in the Detroit bankruptcy case produced downward redistribution, what behavioral or structural forces informed these rules?

Hypotheses

I hypothesize that the role of the court as mediator in the Detroit case allowed federal judges to effectively manage the interest groups represented in the case in order to ratify a Plan of Adjustment whose Asset and Divisor Rules resulted in downward redistribution.

Methodology

Testing this hypothesis will require three steps: identifying the Divisor

and Asset Rules, demonstrating that these rules result in downward redistribution, and, finally, linking the behavior of the court with respect to the creditor interest groups to the formation of these rules. In order to identify the Divisor and Asset Rules I will need to analyze the final version of the city's Plan of Adjustment. The Divisor Rule will be captured in the different returns promised to each group of creditors, and the Asset Rule will be assessed by comparing the value the City of Detroit's assets available to creditors as to the total value of city assets. I want to be clear that I do not intend to provide precise mathematical algorithms for these rules, but rather to identify the particular outcomes they produced.

Next, I will assess whether or not these outcomes were downwardly redistributive. A bankruptcy outcome is redistributes "downward" if it favors the least economically "well-off" participants at the expense of the "well-off" participants. Whether or not a particular participant is favored depends, in the case of a creditor, on the relative difference between return on investment promised to the creditor before versus after bankruptcy (ie, how much the creditor stands to lose as a result of bankruptcy). The counterpart to this loss for the debtor is the value of the city assets that were liquidated to pay creditors. In order to assess the relative treatment of participants in the context of economic position, I plan to use average annual income as a proxy for determining how "well-off" participants are in relation to one another. In the case of city residents or creditor groups such as retirees, this information should be relatively easy to obtain and compare. When it comes to classifying bond insurance companies, who make up a substantial number of the creditors, I believe this information is captured by the annual dividend issued to company stockholders. Once I use the income-proxy to rank participants in terms of how "well-off" they are, I will then compare this ranking to the redistributive outcome of the trial and determine if downward redistribution occurred.

The crux of my argument occurs in the final step, in which I will determine if specific actions by Judge Rhodes and the federal court were directly

responsible for this redistributive outcome. Before Judge Rhodes could approve the Plan of Adjustment, at least one class of impaired creditors needed first to agree to the settlement, after which the court could institute a "cram down," forcing the plan upon the other creditors.[32] The crucial points during the trial when major creditors approved the plan where documented by official news releases and amendments to the Plan of Adjustment, which went through eight different drafts before it was officially approved.[33] I will analyze these documents to identify the concessions and promises made between participants as mediated by the court, and assess how these negotiations balanced the interests and powers of the different groups, ultimately leading to the formal approval of the Divisor and Asset Rules.

Expected Findings

I expect to find that the case was downwardly redistributive, and that the court's mediation efforts were essential to the ratification of the Plan of Adjustment by the creditors. This conclusion would be contingent on a number of different findings. First, I believe city residents and pension holding retirees will be shown to be the least well off (in that order) as compared with bond insurance companies, by virtue of having smaller average annual income. Based on my initial readings of the Plan of Adjustment, I predict that the treatment of these groups by the bankruptcy settlement will reflect this ranking, in that city residents incur the smallest loss, followed by pension retirees, and then bond insurance companies. Together, these results would suggest that the Division and Asset Rules produced downward redistribution in the Detroit bankruptcy trail.

Finally, I expect to find that the mediation efforts of Judge Rhodes and the federal court were essential to the necessary approval of the Plan of Adjustment by creditors. Considering the literature reviewed in earlier sections, it seems that the Detroit case shares many relevant features with the larger

[32]Chad Halcom, "Post-bankrupcty Detroit to Keep a Defined Pension Plan," Crain's Detroit Business (Detroit, MI), Feb. 22, 2014.
[33]"Bankrutpcy/ Chapter 9," *City of Detroit*, Detroit.mi.gov.

American political system with respect to redistribution, particularly the role of business and labor interest groups (in the form of bond insurers and public sector unions) and in the inequality between actors. What appears to be noticeably different, however, is the institutional structure. Instead of interests and inequality playing out within the context of an elected legislature, they are mediated by a court system in which grants judges the power to oversee and facilitate interaction between groups. Thus, I expect an analysis of creditor approval of the Plan of Adjustment, as it was recorded in court documents and press releases, will demonstrate that the court played an integral role balancing the interests and power of the different bankruptcy participants to produce a downwardly redistributive Rules and outcomes.[34]

Limitations

I believe the biggest limitation to this project is the fact that it will rely on official documentation of negotiations between parties during the bankruptcy, when it is possible that unofficial, "closed-door" deals also took place. It is reasonable to speculate, for instance, that while official documents might depict the court as a pivotal actor, private negotiations took place between bankruptcy participants that were in fact much more determinant of the final outcome. This is a difficult limitation to account for as, by their very nature, the frequency or importance such deals would be extremely difficult to assess. It is also worth noting that this project will have very limited direct policy implications, as it not my goal to promote bankruptcy as a method of redistribution in the United States. The filing of municipal bankruptcy is an extreme and rare act, with very rigorous eligibility requirements on the part of the debtor, and would therefore make a poor policy solution on the national level.

[34]I believe the Grand Bargain deal, in which the liquidation of Detroit Institute of Arts assets was avoided through donations from local philanthropies and the state, is a crucial example of the court acting to produce an outcome favorable to Detroit citizens and pension holders. This instance of negotiation relates particularly to the Asset Rule, and is part of my motivation for identifying the Asset Rule as a determinant of redistribution in bankruptcy.

Implications

If my hypothesis is correct, this study could be relevant to scholarship on redistribution as a form of comparison. Specifically, it would speak to arguments which suggest that federal institutions obstruct downward redistribution by demonstrating that said redistribution can occur in a different institutional context with similar inequality and interest groups.[35] On the other hand, if my hypothesis ultimately appears to be incorrect, additional scholarship could be done to pinpoint the common obstructive cause in the Detroit bankruptcy case and the larger American system. Finally, I believe that the methods and concepts outlined in my work could be used to assess other bankruptcies in future research, which might be useful in testing whether or not my observations hold true in other cases, or if the phenomenon I uncover are somehow specific to Detroit.

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[35]Brady, Verba, and Schlozman, "Bringing Data to Downsian Puzzles," 1. Levy and Temlin, Peter, "Inequality and Institutions," 10. Beramendi and Rueda, "The Case of Economic Coordination," 261. Giles, Martin, Page, "Testing Theories of American Politics" 14.

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Sense and Sensitivity: Theories and Empirics of Inflation Aversion at the Populace Level

Erica Mirabitur
From PolSci343, Comparative Political-Economy of Developed Democracies
(nominated by Robert Franzese)

Erica writes clearly and powerfully, in a style excellently fitting the task of expounding positive social-scientific theory. Her acuity of insight manifests clearly in her novel theory as well; the logic is sound; and the argumentation persuasive. Erica's first paper—students in ps343 write two—argues that, since inflation aversion among the public arises from confusion of the real economic hardship associated with adverse relative-price movements with hardship from inflation, i.e., rising average prices (outside of any experience with hyperinflation), inflation aversion should be more pronounced in oil-importing developed democracies & less so in oil-importing countries. She develops this theory and its implications eloquently, and then seeks to evaluate it empirically, comparing resource-rich developed democracies, like Norway, with heavy oil-importers among that set, like Japan. This is outstanding work, substantively, as well as grammatically & compositionally.

Robert Franzese

Sense and Sensitivity:
Theories and Empirics of Inflation Aversion at the Populace Level

Neophytes of macroeconomics, just introduced to the Phillips curve, may be inclined to think that inflation and unemployment are mutually-exclusive and inversely-related economic phenomena. That is, they may believe that a policymaker can barter *x* percent of the employment rate for a y-percent decrease in inflation. Research in American macroeconomics tells a different story, though; one cannot describe the relationship between inflation and unemployment as an enduring, long-run trade-off[1] (Hibbs, 1987). There is, instead, a short-run tension between inflation and unemployment – evading the former may induce the latter, and the possibility of increasing one informs the policymaker as he seeks to address the other.

Although the literature opposes the idea that inflation and unemployment share a mutually-exclusive and directly-inverse relationship in the long-term, both share one feature: Neither are liked among the American populace. For instance, the Survey of Consumer Attitudes and Behavior, a monthly survey conducted in the United States by the University of Michigan's Survey Research Center to gauge public sentiments on economic performance, includes the following question in its repertoire: "As to the economic policy of the government -- I mean steps taken to fight inflation or unemployment -- would you say the government is doing a good job, only fair, or a poor job" (Survey of Consumer Attitudes and Behavior, December 2012). Notice that the survey parallels inflation and unemployment such that an observer would glean that they are the two primary economic evils against which we elect our policymakers to fight. In other words, inflation and unemployment are the fulcrums on which our

[1]Seminal works on this include:
Phillips E. 1967. "Phillips curves, expectations of inflation and optimal employment over time," *Economica* 34 (3): 254-281.
Friedman M. 1968. "The role of monetary policy." American Economic Review 58 (1): 1-17.
Lucas RE. 1976. "Econometric policy evaluation: A critique." *Carnegie-Rochester Conference Series on Public Policy* 1 (1): 19-46.

(diverse) understandings of effective economic management pivot. Alternatively stated, inflation and unemployment – though deemed antithetical by hoi polloi and fledgling students of macroeconomics – are innate to how Americans evaluate economic performance. So retain this: The American populace likes neither inflation nor unemployment.

This piece is interested in exploring the distaste of inflation – or inflation aversion – among the ideological and partisan groups within the American populace. I attribute this interest to Douglas A. Hibbs' text *The American Political Economy* (1987), which argues that the macroeconomic preferences of left-leaning voters differ from those of right-leaning voters and that these preferential differences motivate policymakers of the left to enact policies that differ from those of the right. Hibbs builds the arena in which to make this argument by offering the empirics to support the following notions:

- Marginalized social groups (such as people of color, women, and younger workers) experience the pains of unemployment more acutely than do people situated in privileged or socially-dominant loci (p. 57).
- The impact of unemployment on real income is large compared to the impact of inflation on real income (p.117).
- If inflation does bring any real harm to income, it is felt by those with higher incomes (p. 117).

These points, which serve as the foundations for Hibbs' additional analysis, function as the avenues of inquiry for mine. This piece, in reviewing the literature, first considers the following questions: Why are some people within the American populace more inflation-averse than they are unemployment-averse if the impact of inflation on real income is small? Or in terse terms, what have scholars proposed to explain the psychology of inflation aversion? And how does inflation aversion manifest at the populace and institutional levels? Second, I aim to illustrate one manifestation of inflation aversion through an empirical application, using Gallup data from 2010. In this application, I articulate the methodological challenges that accompany the task.

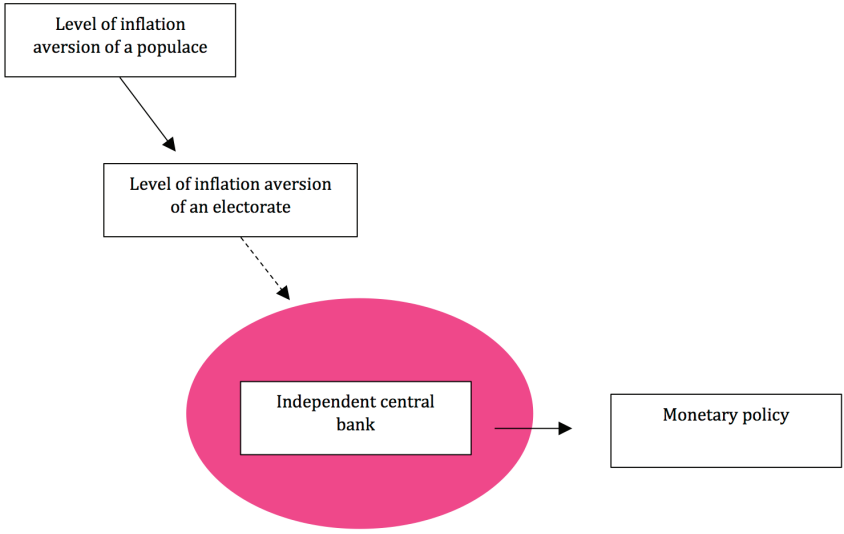
This inflation-aversion peculiarity – why we perceive to endure that which we do not – has spawned scholarship within political-economic thought. Recall that in the United States, individuals with higher incomes are more inflation-averse than they are unemployment-averse compared to their lower-income compatriots (Hibbs, 1987). At the populace level, Americans do not like inflation because they perceive it to threaten their standards of living and the purchasing power of the dollar (Shiller, 1996), and the degree to which a populace is inflation-averse varies across countries (Scheve, 2004; Shiller, 1996). American and German populaces, for example, are more inflation-averse than Brazilian populace (Shiller, 1996).

It is important to note that the study of inflation aversion is not exclusive to respondent-level survey data of members of a populace, or what I call the *populace*-level analysis of inflation aversion. In fact, more of the literature observes inflation aversion at a higher level, reflected not in popular opinion but in policy of the central bank, or the *institution*-level analysis of inflation aversion. One can glean the distinction between the populace-level analysis and the institution-level analysis from their titles; the former studies the macroeconomic preferences of the people that compose the populace, while the latter devotes its attention to institutions within a polity (such as the central bank and its degree of independence from political pressure).

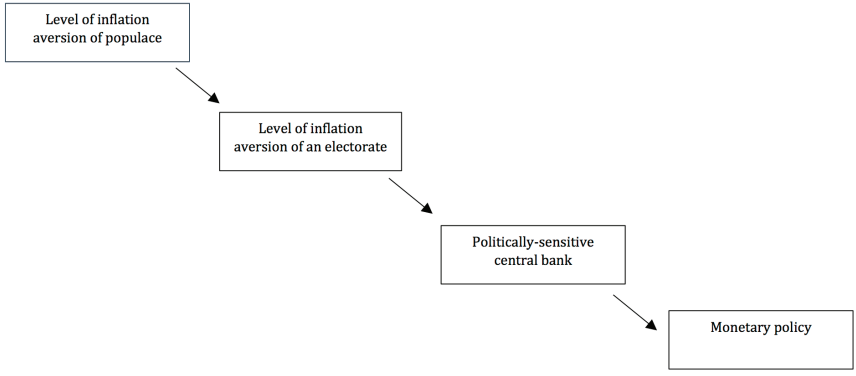
The stylized diagrams below and on the next page affirm the conditional importance of each. In Models 1 and 2, the central bank influences the nation's monetary policy. Model 1 depicts a situation in which a polity's central bank is relatively independent from political pressure. Since this bank is, in theory, independent from the whims and wishes of the electorate, it is also independent from the whims and wishes of the populace. The arrow to connect the electorate level of inflation aversion to the central bank appears dotted, not solid, to represent its inefficacy in influencing the central bank. More, the magenta oval insulates the central bank to represent the idea that independence functions as a political buffer. In Model 2, the central bank is responsive to the preferences

of the populace since its longevity and survival depend, in part, on the electorate's approval. Therefore, the electorate's level of inflation aversion channels the populace's level of inflation aversion and influences the politically-sensitive central bank, which then determines monetary policy. Admittedly these diagrams are simple, but they communicate that monetary policy is a function of central-bank independence and the populace's macroeconomic preferences; therefore, in some countries, the populace's level of inflation aversion is agentic in affecting macroeconomic policy.

Model 1:



Model 2:



This analysis, then, contributes to the populace-level literature on inflation aversion. How have forescholars studied inflation aversion at this level? Let's return to the impetus of this piece: *The American Political Economy*. Hibbs' analysis relies, in part, on survey responses to the Gallup question, "Which do you think the federal government should give greater attention to – trying to curb inflation or trying to reduce unemployment?" (Hibbs, 1987, p. 141).This question is attractive to the study of inflation and unemployment aversions because it pits the two economic outcomes against each other, forcing a respondent to select her more intense aversion. Every respondent's selection, then, determines who is more inflation-averse and who is more unemployment-averse. Ideally, this project would observe an inflation-oriented question across time within groups of the American populace. However, data accessibility complicates realizing this ideal.

Although the social sciences today enjoy robust and ever-evolving archives of data, scholars with inflation-aversion interests will be somewhat unsatisfied for two reasons: 1) No recent survey question, to my knowledge, pits inflation and unemployment against each other to ascertain the inflation-averse from the unemployment-averse or agnostic, and 2) no organization asks an inflation-related question consistently across time such that a researcher could observe inflation aversion across time in one polity. The British Election Study, a product of the University of Essex, asks respondents, "As far as you're concerned, what is the *single most important issue* facing the country at the present time?" [emphasis included in original question] (British Election Study, 2005). Unemployment and inflation are two among more than 40 response options for this question, which yields only an inflation-averse subset of n = 129 and an unemployment-averse subset of n = 49 (British Election Study, 2005). These subsamples are too small to serve as the focus of this analysis. Furthermore, using this question to gauge inflation aversion poses the problem of construct validity. That is, this question is ill-equipped to measure inflation aversion. For example, in the 2005 pre-campaign survey of the British Election Study, 418 respondents

deemed terrorism the most important issue. We do not know if they are more inflation-averse or unemployment-averse or if they remain agnostic between the two, only that they think terrorism is the most important issue.

Another complication is that Gallup, a notable source for producing data on public opinion, is a commercially-operated generator of data, rendering much of the data it harbors on public sentiments of the economy inaccessible to a cash-strapped scholars, much less an undergraduate student. However, the University of Michigan's subscription to the Roper Center for Public Opinion Research, a public-opinion data archive housed at the University of Connecticut, supplied my analysis with some inflation-oriented data (discussed later). I say "some" to indicate a paucity of available and relevant data; perhaps the Roper Center does not quarter all of Gallup's data and, thus, cannot offer it, or perhaps Gallup does not consistently ask the inflation-oriented question.

Note, though, that the aforementioned exists not to criticize past and current research projects. Instead, it is an observation and an invitation within the discipline; if we care to study this phenomenon and, by extension, the macroeconomic policies enacted to respond to public opinion, we must be intentional in what we ask and how consistently we ask it.

In light of these methodological challenges, I employ data collected by Gallup from April 8, 2010 to April 11, 2010 in a national telephone survey of 1,020 adults in the United States. Gallup asked respondents, "…I'm going to mention some things that might happen in the economy. For each one, please tell me whether you are very concerned, somewhat concerned, not very concerned, or not at all concerned?" Two concerns about which responds were asked were "Inflation will climb" and "Unemployment will remain high." In my analysis, an inflation- or unemployment-averse person is one who affirmed the highest level of concern for the economic outcome in question; that is, she responded with "very concerned."

My analysis considers data from one year due to data constraints. While Gallup asked respondents the inflation-worry question in this April 1999 survey,

it did not ask about unemployment worry, an omission I charge to the economic reality of that time. The U.S. Bureau of Labor Statistics reported a 4.2% unemployment rate for August 1999 (U.S. Bureau of Labor Statistics, August 1999), a figure that is significantly smaller than the national unemployment rate in April 2010, 9.9% (U.S. Bureau of Labor Statistics, April 2010). I bring this forth because this piece is not only substantively intrigued about inflation aversion in the United States; it takes a peripheral interest in the methodologies that make possible this research and the challenges that impede it.

Tables 1 and 2 present the data by ideology – Conservative, Liberal, and Moderate – and Tables 3 and 4 present the data by party – Republican, Democrat, and Independent – for both inflation and unemployment. This piece is congruent to Hibbs' in that both examine unemployment aversion to inflation aversion across party identification. However, I also examine aversions across ideological identification. Though party and ideology highly correlate, they are not identical, and this imperfect parity may yield different results. In reading Tables 1 through 4, note that only the figures contained in the first row of concern in each table are analyzed in the preceding work since I consider only "very concerned" survey participants as averse to a particular economic outcome.

Table 1: Percentage of worry about inflation – by ideology

Concern level	Conservative	Liberal	Moderate
Very concerned	67.5%	38.0%	46.7%
Somewhat concerned	24.7%	38.5%	32.9%
Not very concerned	4.1%	13.7%	14.1%
Not at all concerned	2.8%	8.8%	5.6%
Don't know/refused	0.9%	1.0%	0.6%
totals	100%	100%	100%

Table 2: Percentage of worry about unemployment – by ideology

Concern level	Conservative	Liberal	Moderate
Very concerned	74.7%	63.4%	66.1%
Somewhat concerned	19.0%	27.3%	24.5%
Not very concerned	3.7%	4.4%	5.3%
Not at all concerned	2.4%	3.9%	4.1%
Don't know/refused	0.2%	1.0%	0.0%
totals	100%	100%	100%

Table 3: Percentage of worry about inflation – by party

Concern level	Republican	Democrat	Independent
Very concerned	63.9%	42.7%	56.0%
Somewhat concerned	26.4%	33.9%	29.8%
Not very concerned	6.1%	14.6%	8.0%
Not at all concerned	3.2%	6.8%	5.7%
Don't know/refused	0.4%	2.0%	0.5%
totals	100%	100%	100%

Table 4: Percentage of worry about unemployment – by party

Concern level	Republican	Democrat	Independent
Very concerned	37.2%	40.4%	35.8%
Somewhat concerned	44.8%	42.3%	39.4%
Not very concerned	13.3%	13.5%	18.2%
Not at all concerned	4.7%	2.5%	6.4%
Don't know/refused	0.0%	1.3%	0.3%
totals	100%	100%	100%

Tables 1 through 4 convey intergroup aversion for a *specific* and *singular* economic outcome; that is, they speak to concern across group for either inflation or unemployment. For instance, we observe from Table 3 that 63.9% of Republican respondents are inflation-averse and that 42.7% of Democratic

respondents are inflation-averse. However, these tables do not illuminate how economic aversions vary across groups. We must consider, instead, intragroup aversion *between* outcomes. I borrow this methodology from Hibbs who employed marginal rates of substitution to study economic aversion. A marginal rate of substitution is calculated from the ratio of two marginal utilities (Krugman & Wells, 2006, p. 261). Generally in economics, one thinks about this rate in terms of two goods, informing us how much of *widget x* you will forfeit to increase your supply of *widget y*. In the context of unemployment and inflation aversions, a marginal rate of substitution predicts how much of the former you will endure for the latter. Very simply, think of a marginal rate of substitution as an economist's way of quantifying a bargain.

Table 5 reveals the numbers on which Hibbs relied in calculating these marginal rates of substitution. These numbers come from *The American Political Economy* (p. 166), and I present them to better demonstrate the computation and substantive meaning of a marginal rate of substitution. Hibbs' numerator, $\beta_{unemployment}$, is a regression coefficient indicating the increase in presidential approval an incumbent will gain from a 1% increase in the unemployment rate. Democrats, then, will penalize an incumbent with a 0.03% decrease in approval. Likewise, the denominator, $\beta_{inflation}$, is a regression coefficient indicating the increase in presidential approval an incumbent will gain from a 1% increase in the inflation rate. We see from Table 5 that Democrats will penalize the president with a 0.028% approval-rating decrease for a 1% increase in the inflation rate. Finally, the last row of the table calculates the marginal rate of substitution for each party group.

Table 5: Hibbs' marginal rates of substitution

	Republicans	Democrats	Independent
$\beta_{unemployment}$	-0.025	-0.030	-0.015
$\beta_{inflation}$	-0.039	-0.028	-0.031
$-\left(\frac{\beta_{unemployment}}{\beta_{inflation}}\right)$	$-\left(\frac{-0.025}{-0.039}\right) = -0.641$	$-\left(\frac{-0.030}{-0.028}\right) = -1.071$	$-\left(\frac{-0.015}{-0.031}\right) = -0.484$

But what does a marginal rate of substitution illuminate that a regression coefficient cannot? In broader terms, what does a ratio convey that a crude number cannot? Each ratio provides a measure of intragroup aversion between outcomes. The Democrats' marginal rate of -1.07 means that they penalize an incumbent more for ineptitude in decreasing the numerator (unemployment, in this configuration). The Republicans' marginal rate of -0.64 means that they penalize an incumbent more for poor performance in decreasing the denominator (inflation, in this configuration).

Where Hibbs' marginal rates of substitution quantify penalties, my ratios quantify proportions, documented in Tables 6 and 7. In crude terms, where he inserts β, I insert *p*. What we share, though, is this comparison of within-group ratios. In other words, both analyses rely on a twice-relative model. This model posits that it is insufficient to compare the unemployment (inflation) coefficient of Republicans to the unemployment (inflation) coefficient of Democrats in order to assess intergroup unemployment (inflation) aversion. Why is this the case? Table 2 documents the percentage of ideologues that fall in each category of worry for unemployment. Of the conservatives, 74.7% percent are very concerned with unemployment, while 63.4% of liberals are very concerned with unemployment. This simple intergroup comparison of percentages would lead an observer to think that conservatives are more unemployment-averse than are liberals. However, comparing within-group ratios conveys a different story; the liberals' unemployment-to-inflation ratio, 1.668, exceeds the conservatives' unemployment-to-inflation ratio, 1.107. Tables 6 and 7 display these unemployment-to-inflation ratios. But what do these ratios, when compared to each other, tell us about aversions of ideologues? Consider how we derived them. Recall that 63.4% of liberals are very concerned with unemployment, but only 38.0% are very concerned about inflation, which offered $^{63.4}/_{38.0}$, or 1.668. Thus, this ratio tells us how the liberals' salience of unemployment compares to their salience of inflation. In summary, we compare how liberals worry about unemployment to how they worry about inflation, and we repeat the process for conservatives

and for moderates, and this iterative process yields three ratios – one for each ideological group – fit for comparison. Implicit in these iterations is the idea that Group A's aversion to one phenomenon makes sense only when compared to Group A's aversion to another.

Table 6: Unemployment-to-inflation ratio – by ideology

	Conservative	Liberal	Moderate
% unemployment-averse	74.7%	63.4%	66.1%
% inflation-averse	67.5%	38.0%	46.7%
$\frac{(\%unAVR)}{(\%inAVR)}$	1.107	1.668	1.415

Table 7: Unemployment-to-inflation ration – by party

	Republican	Democrat	Independent
% unemployment-averse	37.2%	40.4%	35.8%
% inflation-averse	63.9%	42.7%	56.0%
$\frac{(\%unAVR)}{(\%inAVR)}$	0.582	0.946	0.639

The data display three interesting occurrences, each of which are excavated below.

1. Aversion in the populace

The data affirm a notion iterated throughout this piece: No group – whether it leans left or right or straddles the two – likes inflation, and similarly no group likes unemployment. In particular, it is important to highlight that conservatives do not like unemployment just because it appears that they are more inflation-averse. Recall that 74.7% of them in this sample selected "very concerned" to describe their level of concern. Similarly, liberals do not enjoy inflation just because the data suggest that liberals are more unemployment-averse. These results maintain Hibbs' results on two fronts: 1) the American populace dislikes unemployment and inflation and 2) the two pole-oriented ideological groups

and party groups differ in their strongest aversions. That is, conservatives and Republicans are more inflation-averse than they are unemployment-averse compared to liberals and Democrats, respectively, and liberals and Democrats are more unemployment-averse than they are inflation-averse compared to conservatives and Republicans, respectively.

2. Moderates and independents

This analysis, so far, has largely neglected moderates and independents, only featuring their figures in the tables. However, these tables relay findings that challenge Hibbs' findings on independents. The 2010 unemployment-to-inflation ratios situate moderates and independents in between conservatives and liberals, or republicans and democrats, respectively. Hibbs' data, however, suggest that independents are more inflation-averse than liberals and conservatives. This might results from the changing ideological nature of independents, and recent work on young voters substantiates this notion (Pew Research Center, 2014). More, Klar (2014) found that in a sample of 1,304 respondents in the United States, 61% of independents identified as moderate, while only 20% of independents described themselves as either slightly liberal or slightly conservative, 10% as either liberal or conservative, and 9% as either extremely liberal or extremely conservative. However, we lack a thorough empirical background in this area because work that examines the ideology of – or better, ideological variation within – independents in the United States is scarce. Hastings (1953) notes that the independents voters bear political semblance to Democrats, but it is important to note that his study was exclusive to the city of Pittsfield, Massachusetts, a city in a Democrat-leaning state, and this semblance may not apply to independents across the United States.

To interrogate this, I studied the ideological distribution of self-identifying independents from the American National Election Studies (ANES) for every presidential-election year from to 1988 to 2012. ANES measures ideology on a 7-point scale in which 1 is "extremely liberal" and 7 is "extremely

conservative," and this 7-point scale first appears in the ANES question repertoire in 1988. These histograms congregate in the appendix of this piece. Inclusion criteria for these histograms were 1) to identify as an independent and 2) to provide some measure of self-rated ideology on the ANES 1-7 scale. Table 8, on the following page, condenses the information from each histogram, conveying the proportion of ideology-providing independents that placed themselves as some degree of liberal (placement scores 1-3) and the proportion that characterized themselves as some degree of conservative (placement scores 5-7).

Table 8: Political Ideology across American Independents, 1988-2012

Year	Liberal	Conservative
1988	22.71%	39.52%
1992	25.54%	37.95%
1996	21.74%	38.55%
2000	21.15%	35.57%
2004	26.47%	29.56%
2008	28.29%	31.68%
2012	20.13%	33.73%

Source: American National Election Studies, Time Series Studies 1988-2012

Though rudimentary, these histograms and Table 8 complicate the idea that the ideological distribution of independents has undergone clear, consistent and significant changes.

3. Ideology versus party

Perhaps the most surprising findings from the data rest in the distinction between ideology and party, or the lens through which we trifurcate the populace. It seems that the strata used to calculate economic-aversion ratios matters for determining economic aversions – not in how intragroup aversions between outcomes vary – but in how the American populace worries about unemployment

and inflation. Table 6, which focuses on ideology, tells a different story than Table 7, the party-focused analysis. Table 6 suggests that every group is more unemployment-averse than it is inflation-averse, evidenced by ratios greater than 1.00, while Table 7 submits that every group is more inflation-averse than it is unemployment-averse.

References

American National Election Studies. ANES 2012 Time Series Study [dataset], ANES 2008 Time Series Study [dataset], ANES 2004 Time Series Study [dataset], ANES 2000 Time Series Study [dataset], ANES 1996 Time Series Study [dataset], ANES 1992 Time Series Study [dataset], ANES 1988 Time Series Study [dataset]; Stanford University and the University of Michigan [producers] www.electionstudies.org (accessed November 16, 2014).

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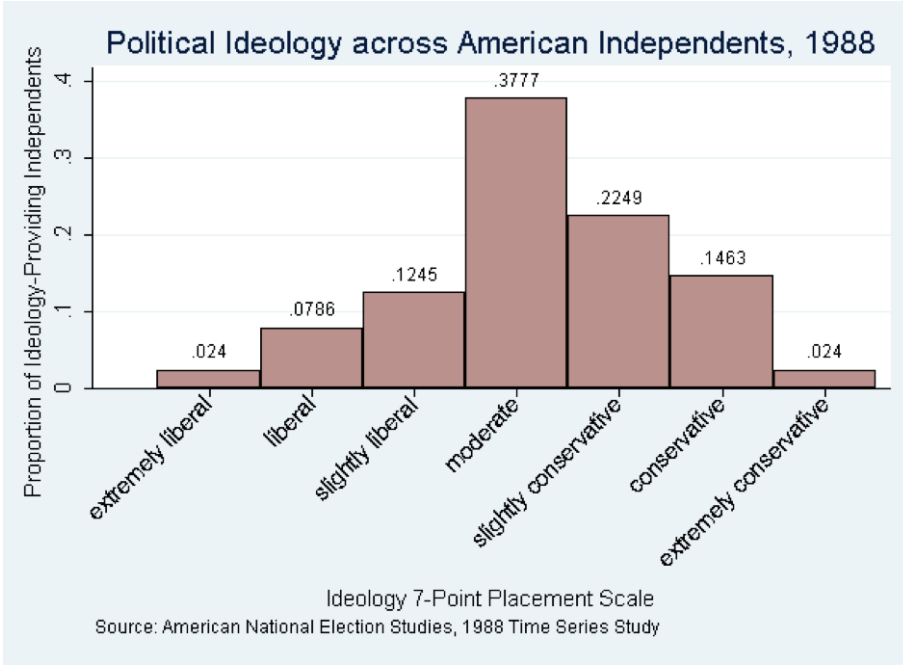
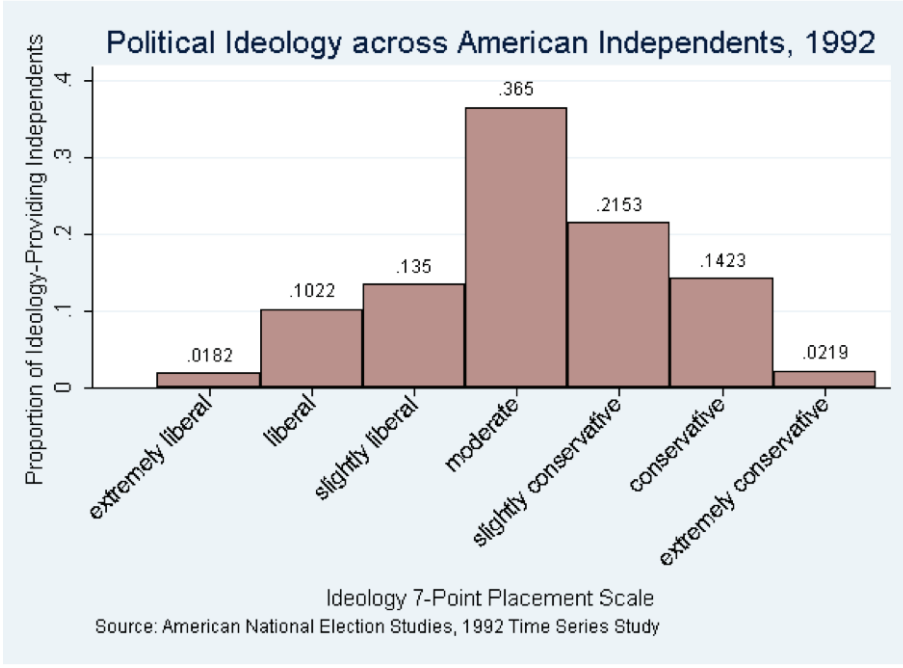
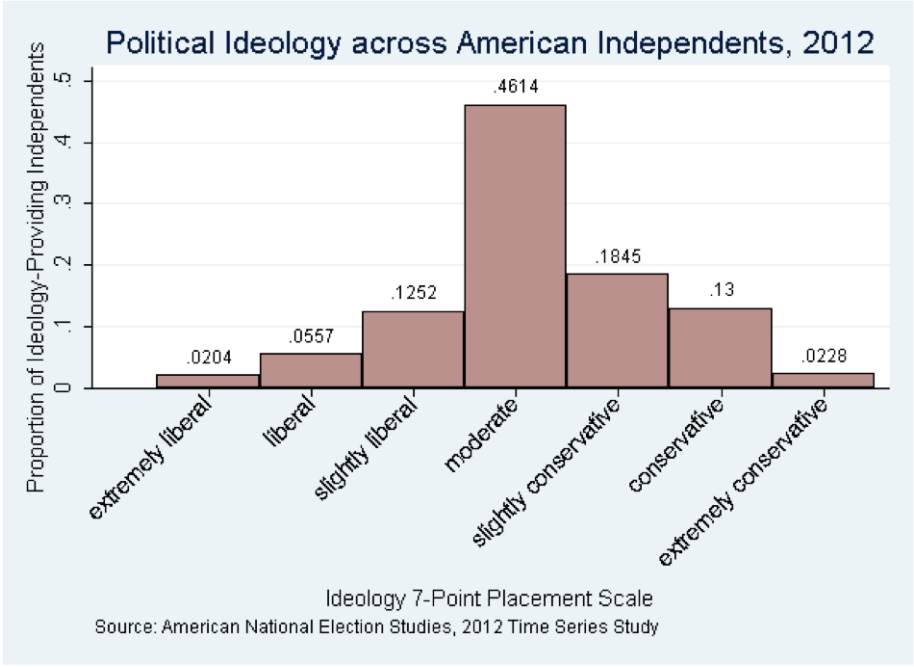
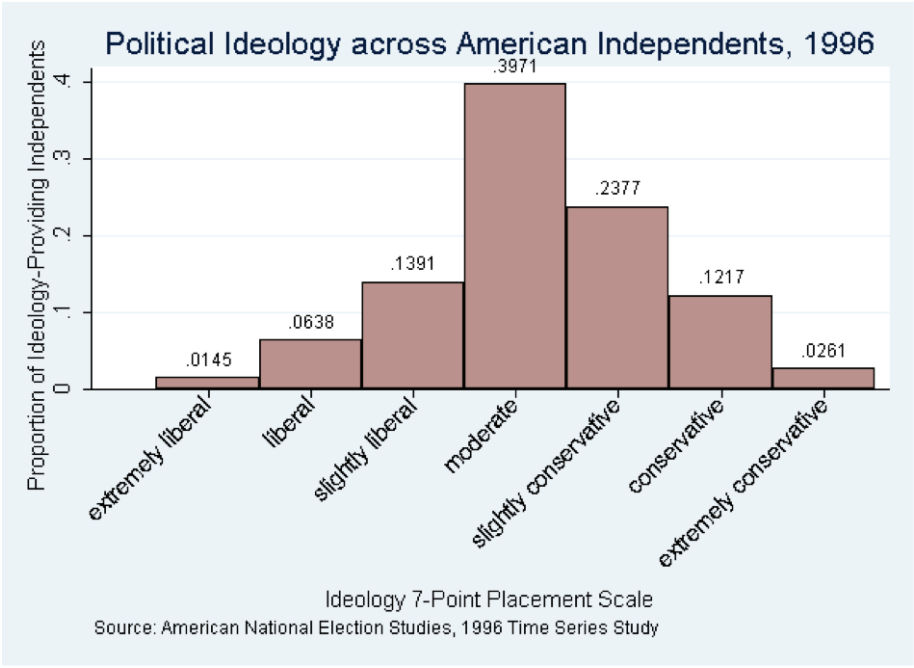
U.S. Bureau of Labor Statistics. April 2010. "Regional and state employment and unemployment – April 2010." (accessed November 2, 2014) http://www.bls.gov/news.release/archives/laus_05212010.pdf.

Appendix


Political Ideology across American Independents, 1988
Proportion of Ideology-Providing Independents
0
.1
.2
.3
.4
.024
.0786
.1245
.3777
.2249
.1463
.024
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 1988 Time Series Study


Political Ideology across American Independents, 1992
Proportion of Ideology-Providing Independents
0
.1
.2
.3
.4
.0182
.1022
.135
.365
.2153
.1423
.0219
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 1992 Time Series Study


Political Ideology across American Independents, 2012
Proportion of Ideology-Providing Independents
0
.1
.2
.3
.4
.5
.0204
.0557
.1252
.4614
.1845
.13
.0228
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 2012 Time Series Study


Political Ideology across American Independents, 1996
Proportion of Ideology-Providing Independents
0
.1
.2
.3
.4
.0145
.0638
.1391
.3971
.2377
.1217
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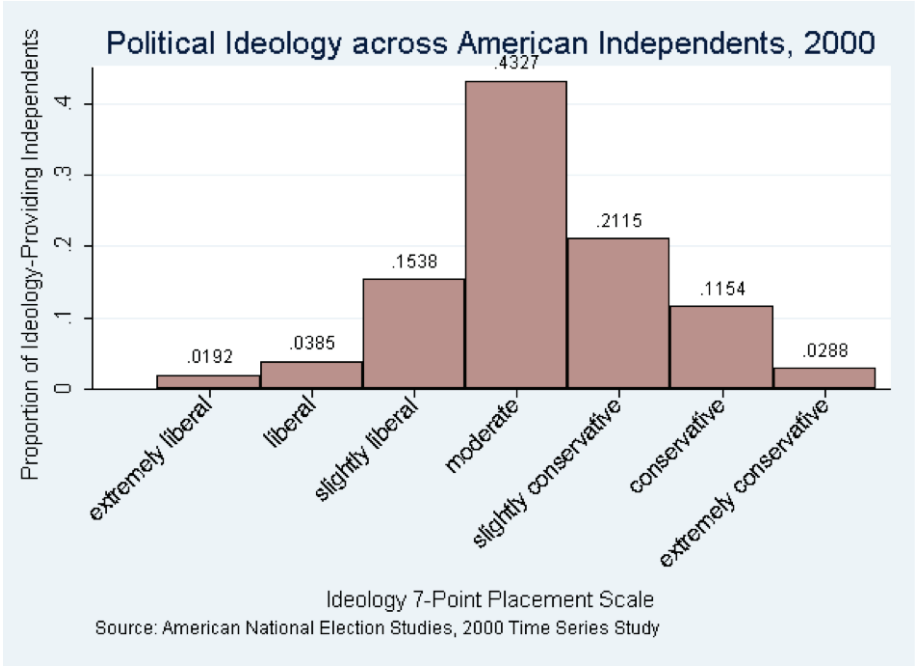
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 1996 Time Series Study


Political Ideology across American Independents, 2000
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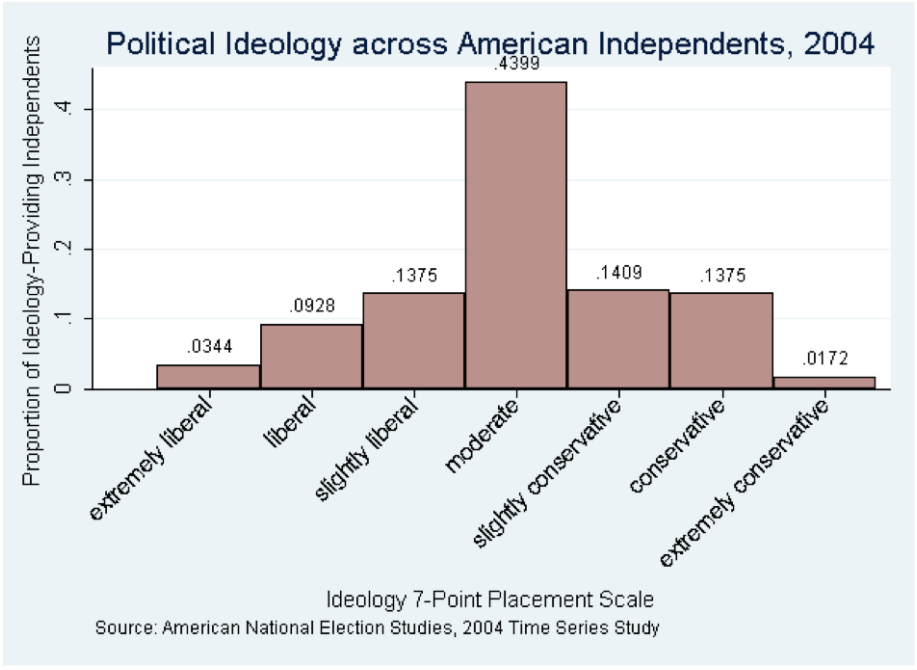
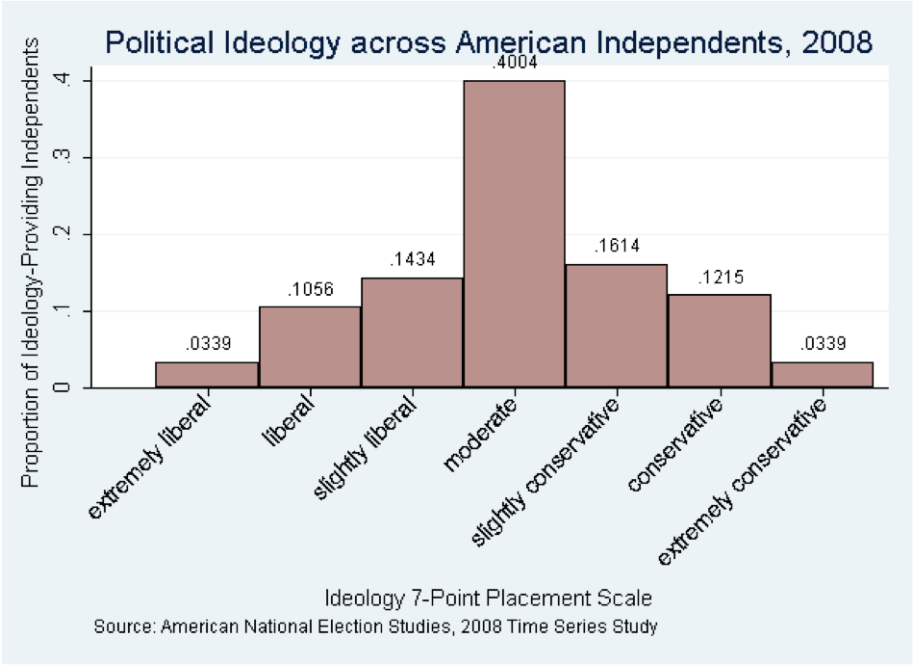
.2
.3
.4
.0192
.0385
.1538
.4327
.2115
.1154
.0288
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 2000 Time Series Study


Political Ideology across American Independents, 2004
Proportion of Ideology-Providing Independents
0
.1
.2
.3
.4
.0344
.0928
.1375
.4399
.1409
.1375
.0172
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 2004 Time Series Study


Political Ideology across American Independents, 2008
Proportion of Ideology-Providing Independents
0
.1
.2
.3
.4
.0339
.1056
.1434
.4004
.1614
.1215
.0339
extremely liberal
liberal
slightly liberal
moderate
slightly conservative
conservative
extremely conservative
Ideology 7-Point Placement Scale
Source: American National Election Studies, 2008 Time Series Study

Winning Essays
Granader Prize for Excellence in Upper-Level Writing (humanities)

President Barack Obama's State of the Union Address

Katherine Koziara
From Writing 420, Minor in Writing Capstone
(nominated by Shelley Manis)

This state of the union speech, written in October and November of 2014 as if for the January 2015 address, beautifully demonstrates Katie's careful synthesis of her multifaceted research (genre, historical, policy, world events, etc.) and application of that research in an outstanding way relevant to the world outside the university.

Shelley Manis

President Barack Obama's State of the Union Address

Mr. Speaker, Mr. Vice President, Members of Congress, distinguished guests, and my fellow Americans:

I begin by congratulating the men and women of the 114th Congress. These are my last two years as President, and I look forward to working with you to improve our nation in the next 24 months. Middle class Americans sent a clear message in November: they want us to focus on their ideas and goals rather than ours. And we, as representatives of the United States of America, have a responsibility to do just that.

Americans have real concerns going into these next two years. They're worried about another government shutdown. They're worried about bills getting vetoed. They're worried about a stalemate between the executive branch and the legislature.

Liberals fear the outcomes of a Republican controlled House and Senate. Conservatives are agitated with my executive action regarding immigration. Across America, disenchantment with Washington is spreading, and it's not spreading slowly. Last year's midterms featured a voter turnout of 36.4 percent, the lowest voter turnout since 1942.

Let me talk a little bit about the midterm elections in 1942. At the time, we were a nation at war. We declared war on Japan less than a year before Americans went to the polls, and the Axis partners declared war on the U.S. a few days after the bombing of Pearl Harbor. America was doing its best to crawl out of the Great Depression. In many places around the country, minorities were not able to cast their votes due to discriminatory laws. DDT was first used on crops before the midterms, signaling decades of environmental degradation to come. And abroad, Nazi leaders worked on creating their "final solution," the Holocaust.

But shortly after Americans stayed home instead of going to the polls, things turned around. Washington heard the message and began accomplishing the goals of the American people. The Allied forces won World War II. Our troops

came home victorious. The economy picked up, and both men and women found a place in the American workforce. The Civil Rights Movement began shortly thereafter, and schools, restaurants, malls, and restrooms became desegregated. Rachel Carson started an environmental movement with Silent Spring that continues to this day. America became a beacon of democracy, stopping genocide and human rights violations abroad through combat and through diplomacy. And we saw the formidable spirit of the American people in action.

Today, we face similar disenchantment. The problems of today seem insurmountable to the American public. We encounter difficulty when trying to end our country's longest war. We struggle to agree on the facts of climate change, let alone begin solving this global problem. We see racial tensions lead to devastating consequences across America, and observe how inequalities between men and women continue to hurt our nation.

Hopes for good solutions are shattered further when factoring in the gridlock in Washington. Today, we may face difficulty in agreeing what the best course of action is. But we can work together to solve the problems our constituents face on a daily basis. We can have a success story like the one that took place after the midterm elections of 1942. We can use the low voter turnout of 2014 as a mandate for the federal government to solve these pressing issues.

By remembering the resilience of America, we can find common ground. By creating high-quality, bipartisan solutions, we can restore the American public's faith in the government. Inaction is no longer an option. A government shutdown is no longer an option.

I will continue to seek out good ideas, which don't always come from one party. For the next two years, we will focus on people, rather than politics. Together, we can use our influence to construct policies that benefit Americans.

These policies should help folks like Shayla Gayton. Shayla understands firsthand the hardships facing many Americans. Growing up on the Standing Rock Indian reservation, Shayla lost two of her friends, one to a drunk-driving accident and another to suicide. Because of these tragedies and their effect on her

community, Shayla elected to study psychology at Purdue University. When I met with Shayla and her peers at the White House, I could tell they doubted they would get the same opportunities as others across the country. But we can give them hope. As Shayla said, "Someone as big as the president of the United States cares about us."

Shayla is here tonight, and I want to let her and her peers know that we, the federal government, care about them. In the next two years, we're going to create policies that increase access to higher education to make college a possibility for Shayla and her friends. We're going to subsidize clean energy to ensure a future for our children. We're going to find common ground on the immigration debate to restore America's faith in Washington. And we're going to demonstrate the power of diplomacy and cooperation both at home and abroad.

I spent the first half of my second term in this manner. Small business owners are able to cover their employees at up to 4 percent less than before the Affordable Care Act took effect. Middle class tax cuts are jump-starting the economy, allowing families to spend or save an extra $40 each pay-check. In March, I announced gainful employment regulations to protect college students from unaffordable loans. I have worked to protect the environment, including fishing regulations, clean air initiatives, and investment in renewable energy.

But I'm not the only one working to better our country. Every day in America, teachers are contributing to the future of America, teaching our children important skills in science, technology, engineering, and mathematics. Public health officers are protecting us from infectious diseases. Engineers are working to design bridges, roads, and buildings. Public safety officers are responding to crises, protecting our neighborhoods, and preventing emergencies. Scientists are studying the climate, warning us about natural disasters. Farmers are working hard each day to grow the food we put on our tables at night. Doctors are making sure we are healthy and are providing us with options when we are ill. Military officers are keeping us safe at home through their work abroad.

Members of Congress, all of these individuals serve the public, just like

us. We have an obligation to them, to provide them with an environment where they can find these jobs. We have an obligation to them to ensure their wages from these jobs cover their cost of living. We have an obligation to them to continue to improve the economy.

And we are doing just that. Last year, I stood in front of you and America and declared we would expand opportunity in this country. With an unemployment rate below 6 percent, the lowest it has been in six years, we're doing just that. In fact, the second half of fiscal year 2014 saw the fastest growth rate of our economy since 2003. We are improving manufacturing, exports, energy, and innovation to ensure opportunity for all Americans.

Manufacturing is the backbone of America, and the past few years have seen manufacturing add more jobs than any other period since 1989. More than 250,000 auto jobs have been added during my presidency. In the last 52 months, businesses have created jobs for 9.7 million Americans. Additionally, my manufacturing initiatives introduced during the 2012 State of the Union address help cities like Detroit, Cleveland, Pittsburgh, and Raleigh grow their economies. In the last two years alone, American manufacturers added more than 500,000 jobs.

But supporting the middle class means more than just investing in manufacturing jobs. It means investing in domestic energy that keeps our middle class jobs up and running. We now are the number one oil and gas producer in the world, and import less oil than we produce at home. In fact, we beat our goal of cutting oil imports in half six years ahead of schedule.

Supporting the middle class also means investing in a clean economy, offsetting our carbon footprint, and reducing our greenhouse gas emissions. Five years ago, I signed the Executive Order on Federal Leadership in Environmental, Energy, and Economic Performance. Federal agencies have since cut greenhouse gas emissions by 17 percent. We are now almost halfway to our goal of getting 20 percent of our energy from renewable sources from 2020. In the last eight years, we have cut potable water use by 19 percent. Federal agencies are leading the charge, but there is still more to do.

According to the National Park Service, Glacier National Park will lose the remaining glaciers by the year 2030. Acres burned from wildfires will increase up to 100-fold by the year 2050. Climate change will increase the incidence of allergies, food and waterborne diseases, and weather disasters. To prevent this, we will make changes at the governmental level. The EPA proposed a rule to reduce carbon pollution 30% by the year 2030, the equivalent of taking 2/3 of all motor vehicles off the road. This rule will result in 25% less smog and soot. The General Services Administration will change government building infrastructure to reduce nighttime loads on buildings, and the FBI will ensure new buildings are 30 percent more energy efficient.

Let me be clear, the government is taking on climate change, but we need all Americans to work towards sustainability. Businesses can purchase energy efficient equipment and can organize work carpools. Families can make sure they recycle and can increase insulation in their homes to save money and energy. Together, we can work to give our children a cleaner world.

In order to give communities the chance to work with us on climate change, we need to make sure they have enough money in their pockets to be able to make energy conscious choices. Congress has not raised the minimum wage in seven years, despite inflation. Right now, federal minimum wage is only $7.25 an hour, meaning Americans working at these rates only make $14,500 a year.

Congress needs to give folks like Fred Green a raise. Fred works at a Speedway in Detroit, but increased costs of living combined with no increase in pay made his apartment unaffordable. Even though he works 35 hours a week, he is on Medicaid because he doesn't make enough to pay for private insurance.

Last year I asked Congress to raise the minimum wage to $10.10, which would benefit Fred and other Americans, young and old. The 113th Congress voted against this change, and now it's on you, the 114th Congress, to ensure American families making minimum wage don't fall below the poverty line. Do not continue the Republican platform of blocking changes that help Americans. Choose to follow the 13 state Congresses who have raised their states' minimum

wages. Choose to follow the 21 cities that have raised their workers' minimum wages. Choose to follow small businesses and larger companies such as Gap Inc., Disney, and Ikea who are increasing their starting wages. Make no mistake, if Congress won't work with us to get this done, we will work with state Congresses, mayors, and governors instead. Together, let's give America a raise.

Women make up almost half of the workforce, and they deserve a raise, too. Supporting the middle class means supporting women through equal pay. Women bring home 78 cents to the dollar of their male coworkers. Every two weeks, they bring home 22% less than men, which is unfair to them, their families, and their children. It's also unfair that they don't get paid family leave to take care of their health or the health of their parents and children. It is unfair women can be fired due to pregnancy. It is unfair parents can't afford quality childcare. Let's change that this year. Fighting for women in the workforce is synonymous with fighting for the economy.

We also need to fight for the economy by reforming our broken immigration system. The Congressional Budget Office estimates that immigration reform will increase real GDP by 3.3 percent in the next decade. That's $700 billion more money in our economy. Immigrants start 28 percent of all new U.S. businesses, and 50 percent of Fortune 500 companies were founded by immigrants.

And still, Congressmen and Congresswomen on the right side of the aisle in the House refused to acknowledge the economic benefits of immigration reform and blocked a Senate bill that would begin to address these issues. It's time to streamline immigration. Citizens are waiting years before their families are able to join them here. Foreign students are barred from working or starting a business in America. Employers are dealing with outdated annual visa limitations and slow bureaucracy, impeding economic progress. There is no clear path to citizenship for individuals who are here illegally. They shouldn't skip people in line who are here legally, but they should have a process that involves background checks, taxes, and language skills so they, too, can help make America great.

Make no mistake; I don't take executive action lightly. But when we have

a pressing issue, like the influx of unaccompanied minors crossing over the Texas border or the millions of unauthorized immigrants working here with no path to citizenship, and Congress decides to do nothing about it, the executive branch has to take action. We will fix the immigration system since Congress won't work with us.

We need to address immigration issues, but we also need to ensure a future for our folks at home. How do we get people into the middle class? The best answer today is through higher education. Young people who earn a bachelor's degree will make an average of $28,000 more per year than young people without one, and they are three times less likely to be unemployed. For the young people listening, you may say this is great information, but without the ability to afford higher education, it's insignificant. I agree.

That's why I invited college presidents and nonprofit leaders to the White House to talk about reaching underserved students shortly after last year's State of the Union address. We're working to support students who need assistance getting to and completing college. I am calling on Congress to pass a bill letting students refinance student loans to current rates, and I'm calling on Congress to tie federal financial aid to the performance level of the universities who receive this money. We are creating a college scorecard, making it easy to compare schools to determine which educational investments are worth it. These initiatives will improve access to higher education.

Getting to college starts with a great K-12 education. We're working on that too. Unfortunately, the poorest school districts often have the least experienced and least supported teachers. These kids need incredibly skilled teachers, but that experience level is not there. That's why I started the Excellent Educators for All program this year. States will evaluate how they're distributing great teachers and what they are doing to train teachers for school districts with the most need. We're going to look at best practices and provide technical assistance so teachers can ensure all children feel equipped to apply to college.

But we can start even sooner, improving education by increasing access to

quality early childhood education. Parents shouldn't have to choose a lower quality day care because of financial restraints. Mothers shouldn't have to leave their careers to take care of their children because they can't afford day care. My Preschool for All Initiative aims to increase the number of children enrolled in pre-K to 6 million by 2020. Right now, only half of the 8.1 million children between the ages of 3 to 4 are enrolled in these programs, and only half of the children enrolled are in public programs. A few months ago, I signed the Child Care and Development Block Grant program, which will improve child safety and quality of care. It will also make sure parents receiving subsidies for childcare won't automatically lose that assistance if they get a raise. Children deserve quality education at an early age, and parents deserve the option to continue working.

Families also deserve access to healthcare. Last year, the Williams family of Augusta, Georgia, was able to save $13,000 on their health care premiums through HealthCare.gov. This meant they had over $1000 extra in their pockets each month to invest in their family-run trucking business. Their family members are part of the 10 million Americans who gained healthcare coverage as a result of the Affordable Care Act, and seven million Americans who were able to enroll using their state or the federal marketplace. Before the Affordable Care Act, people often saw spikes in their premiums on an annual basis. Now, premiums have stabilized. New, lower-cost plans are available as a result of this law.

Policies no longer include lifetime dollar limits for individuals with cancer or other chronic illnesses. Parents of the more than 17.6 million children with pre-existing conditions such as allergies or asthma no longer have to worry about finding a plan that will cover their child. These two policies were phased out last year. And if you fall ill, but made a mistake on your application, insurance companies are no longer able to drop your coverage.

If you are not covered, check out Healthcare.gov. Look at the options. Learn how easy and affordable it is to sign up. Last year, 85% of customers who chose a Marketplace plan had financial assistance in the form of tax credits. Almost half of these individuals were able to receive coverage for $50 a month

or less. You could fall into this category too. Open enrollment is available until February 15th.

Now I want to talk about a health issue that received a lot of attention this fall. Ebola remains a threat to individuals around the world, and even though coverage of the crisis has waned, challenges associated with fighting the disease remain. I have invited doctors Bryce Gartland and Bruce Ribner here, who directed care for Ebola patients at Emory University Hospital, along with Dr. Kent Brantly, Ebola survivor, here today as an example of how the healthcare system excels when mitigating these types of threats.

Dr. Martin Salia, Patrick Sawyer, and Thomas Duncan were not so fortunate. And we remember the thousands of individuals in West Africa who died from Ebola, and the even greater number of individuals who continue to fight this very serious disease. This is why we continue to work internationally and domestically to solve this crisis. Our civilian and military efforts in West Africa have seen promising results. At home, scientists continue to work on vaccines and treatments for Ebola, and crisis management strategies for future disease outbreaks. In the midst of this crisis, we need to remember we have the world's best health professionals working to keep us safe. By heeding their advice and focusing on the facts rather than fear we can remain healthy.

Here's another fact to focus on: we had an election last year. And here's the deal: that election did not go as well for the Democratic Party as we would have hoped. But weak midterm turnout by the Democratic Party was partially due to the fact that in 2014, there was a bigger focus on voter fraud than on voter rights. As I said last year, only 40 votes out of 197 million cast in federal elections between 2002 and 2005 were indicted for fraud. Yet still, Republicans want to make voting more and more difficult for people by limiting early voting and enacting voter identification requirements that affect minority or low-income voters who lack a photo ID or can't access the polls during the week. I am going to work through during the last part of my presidency to guarantee every voice in America is heard on Election Day.

And we need to guarantee every citizen of the United States is afforded the same rights. During my first State of the Union address, I stood up here and I told you I would work with Congress to "repeal the law that denies gay Americans the right to serve the country they love because of who they are." The next year, I signed the Don't Ask, Don't Tell Repeal Act of 2010, ensuring gay men and women could openly serve in the military. In 2012, I released a Presidential Memorandum regarding hospitals receiving Medicare and Medicaid funds. They now must respect the rights of same-sex individuals and their partners when determining visitation and medical decision-making. Same-sex partners of Foreign Service and executive branch government employees now also receive federal benefits. In 2013, the Supreme Court struck down the Defense of Marriage Act, a discriminatory and unconstitutional law.

I do these things because I see members of my staff who are in committed same-sex relationships, raising kids. I see U.S. soldiers fight for their country abroad and come home to a system where they are unable to marry their partners. I see my own children fail to understand why same-sex couples are denied marriage, giving me pause to think about the overwhelming support younger Americans show for change. And I stand here today, committed to working on this issue, because it reminds me so much of the Civil Rights Movement of the 1960s, without which, I wouldn't be giving this address today.

The Civil Rights Movement resulted in further solidification that America is a country where everyone should be treated fairly and equally without regard to race, gender, or sexual orientation. Sometimes, however, we are not successful in this endeavor. In Ferguson, we saw a small bit of a larger national narrative coming out of a history of racial discrimination. A grand jury decided not to issue an indictment in the case of Michael Brown's death.

Law enforcement and communities of color should have a relationship of collaboration rather than of suspicion. We need to identify best practices in communities that are dealing with this effectively. And we need to ensure police forces are representative of their jurisdictions. And we need to incorporate the

community to fight crime, too. America has come a long way regarding race relations, and we need to keep focusing on these problems to make sure our country is all it can be.

Michael's parents are here today, and they want us to make sure his son's death is not in vain. Mr. Brown stated, "I want it to lead to incredible change, positive change, change that makes the St. Louis region better for everyone." I go a step further. I want his death and the ensuing discussion to lead to change that makes America better for everyone.

And we need to remember the deaths of Americans who die from citizen-propagated gun violence every year as well. The 20 children and six adults who died during the shooting at Sandy Hook elementary school shouldn't die in vain either, and neither should other victims of gun violence. According to a study conducted at Harvard, mass shootings have increased threefold since 2011. There is a mass shooting every 64 days on average, and we still can't pass gun control laws. Republicans, I'm calling on you to pass the common-sense gun reforms America is asking for. Pass the universal background checks that help prevent dangerous people from purchasing a gun. 90 percent of Americans support this type of legislation, but yet we still don't have a law. That's not democracy. That is a group of politicians putting their needs over the needs of their constituents. And this year we need to bring an end to this practice so we can try to prevent these mass shootings.

We need to fight violence at home. But we must also fight violence abroad. As the Commander-in-Chief, it is my highest priority to ensure the safety of this country. This was the aim of the previous Commander-in-Chief when embarking on the War in Afghanistan. In the past 13 years, we have worked to deter the plans of al Qaeda, eradicated Osama bin Laden, and prevented new leadership from becoming very powerful. We have also bolstered Afghanistan's economy and social prosperity by extending opportunities to women and girls, building a democracy, and transitioning security operations to Afghan citizens. We're finishing the job we have started and we are reducing our presence in this

nation throughout the year.

That doesn't mean we will stop encouraging peace in the Middle East. We are committed to security and prosperity in the Middle East, but these goals are complex.

Israel has a right to defend itself, and we have a commitment to assist our ally. This means investing in technologies such as the Iron Dome so Israeli children can go to bed at night without the fear of death from a rocket. This means fighting against Hezbollah, so their terrorist attacks against citizens and support of the massacre of innocent civilians in Syria cease. This means using negotiations to stop nuclear development in Iran, a country calling for Israel's destruction.

Israel works to formulate peace, but these efforts are often unsuccessful. After withdrawing from Lebanon and Gaza, they faced rocket attacks. After reaching out to others in the region, they met anti-Semitism and rejection. I recognize that.

But I also recognize the Palestinian people's right to justice, and other countries need to do the same. Palestinian children don't have a place to call home. We cannot fail to recognize that they can't farm their lands, or study at a school across the West Bank, or have access to opportunities and success. And although turmoil and distrust continue, many Palestinians are embracing peace and rejecting violence.

We can build on this. Through negotiations, we can create two states for two peoples. Through condemning violence, we can foster a sense of security and stability in this region. This doesn't mean the talks will be easy, or tensions won't run high, or violence and distrust rooted in centuries of history will quickly subside. But through diplomatic assistance, we can help foster the peace this region needs.

But the conflict between Israel and Palestine is not the main source of discord in the Middle East. While diplomatic efforts will continue to try to bring peace to the Gaza Strip, we also need to continue fighting other threats to our national security. During my administration, we removed 150,000 troops and

started to conclude a decade-long occupation in Iraq.

Today, in Iraq and elsewhere, we face a terrorist group of a different name but of similar aim as our former enemies: to slaughter anyone who stands in its way. The Islamic State of Iraq and the Levant was al Qaeda's Iraq affiliate and is now taking advantage of the Iraq-Syrian border to gain power.

This situation needs to be looked at as a comprehensive issue, and will be dealt with using a militaristic, diplomatic, and humanitarian strategy. ISIL threatens the safety of our country as well as the safety of Iraqis and Syrians, and counterterrorism efforts must be made. Counterterrorism can take the form of boots on the ground, it can take the form of strong international partnerships, and it can take the form of diplomacy tools like sanctions. In the fight against ISIL, we are employing a combination of these strategies to ensure we effectively but efficiently mitigate this threat. We need to exercise precaution when sending troops abroad, and this administration is focusing on counterterrorism rather than occupation as promised.

Sometimes, diplomacy takes time to be successful. We are working to resolve the nuclear situation in Iran, and real and substantial progress has been made. There are still points of contention, and the talks are difficult, but both Iranian leadership and our administration remain committed to a comprehensive solution. Our target date for these negotiations is June 30th of this year, and we will continue to grow Iran's breakout time to develop a nuclear weapon through these peaceful talks.

Let me be clear, increasing this breakout time is pivotal to both peace in the Middle East and peace across the world. Iranian nuclear capabilities would undermine non-proliferation. It would cause an arms buildup and resulting tension between governments around the globe. This is unacceptable.

Global tensions are running high due to the situation in the Ukraine as well. But last year, I stood here and promised I would not allow our sons and daughters to be put into harm's way unless it was necessary. I remain committed to this, and am focusing on a diplomatic resolution in this region rather than a

combative one.

Russia continues to support Ukrainian separatists with assistance by troops. This idea that a nation can redraw another nation's borders is not what America stands for. We will continue to support our NATO alliance in the region and use policy tools such as economic sanctions until Ukraine regains its sovereignty. Through diplomacy we can move away from continuous wars.

Though we are facing these tough international problems, we are also strengthening our relationships with other countries. Being the world's leader involves more than just war and hard diplomacy. This position gives us the opportunity to undertake noble causes abroad, to forge strategic partnerships, and to bolster the global market. And after two lengthy and costly wars, we turn to Asia to demonstrate how international cooperation is the most effective route to prosperity.

Asia's future is embedded with our own; this region contains half of the world's population and a large portion of global nuclear power. Because of this, Asia can influence whether the 21st century is one of collaboration or one of constant struggle.

In order to pursue a century of collaboration, we must encourage open and transparent economies in the region. By promoting security and fair trade in this region, we can achieve our main domestic goal, job creation. That doesn't mean exploitation of their markets. It means economic partnerships with countries such as South Korea and Australia. It means consumer protection and sustainable growth. It means stepping across the aisle to pass the Trans-Pacific Partnership. Democrats, this is where we can work with Republicans to achieve a common goal: to give Americans a more prosperous economy and ensure workers' rights abroad.

I am going to do all I can to better our relationship with Asian countries in my last two years in office. Later this week, I will visit New Delhi, as Prime Minister Modi invited me to be the Chief Guest at the Indian Republic Day Celebration. This yearly event celebrates India's adoption of their constitution.

By celebrating India's democratic government, we can encourage representative government in this region.

And I will work to maintain our positive relationships with our NATO allies and our historic alliances with European countries. Our diplomacy has helped us avoid conflict with one another, and has placed international pressure on those outside the alliance who wish to start conflict. We will continue to use these relationships to maintain a peaceful world.

And we can't forget those who work every day on our behalf to maintain our national security. We can't forget to honor their sacrifices and the sacrifices of their families.

This year we welcomed a new Secretary of Veterans Affairs, Bob McDonald. Bob is working hard to shrink the wait times for our veterans receiving health care. He is also continuing the great work done to reduce veterans' homelessness, which is down 33 percent since 2010.

A big step in preventing veterans' homelessness is making sure these heroes are equipped for jobs once they complete their service. We set up veterans' employment centers, created the New Transition Assistance Program to help with the transition from the military to the private sector, established tax credits for companies hiring veterans, and will continue to support our troops while their actively serving as well as after their final tour of duty is over.

We heard the message earlier this year when we discovered we weren't doing an acceptable job of taking care of our military members. This is an effort that starts at the federal level, but extends to every U.S. citizen. Because, at the end of the day, folks, they are the ones keeping us safe. They're the ones leaving their homes, their families, and their communities to preserve ours. And our soldiers need us to show them how much we appreciate their service.

That is exactly what people like Christine Vance are doing. Four years ago, Christine, along with her family and friends, set up Heidi's Pantry, an informal food pantry that serves military families near Fort Belvoir, Virginia. This past year, she coordinated 40 Thanksgiving meals for those in her area who weren't able

to purchase a holiday meal. At Christmastime, Christine makes sure the children of struggling military families are assigned volunteers, who buy presents for these children who otherwise would not receive gifts.

Christine knows what it is like to not have enough money to put on the table. And as a wife of an army sergeant and a mother of six, she knows the importance of taking care of our military families. "We are supposed to be sisters in the military, brothers in the military, and it's time we acted as such," Christine says.

I've invited Christine and her family to be here today, and I call upon our country to take Christine's call to action one step further. It's time to take care of our fellow Americans. It's time to put forth our best effort for this great country we get to call home. That means Congress needs to step it up. It means this administration needs to do more. And it means citizens all around the country need to continue to work together to make sure the America we give our children is one of that fulfills our vision: a country that values justice and equality, a country that extends opportunities for advancement to every citizen, a country that fights for and defends freedom from oppression and fear both domestically and abroad.

70 years ago, citizens stayed home from the polls because they didn't believe the government could solve the monumental challenges our country faced. We have problems today that seem just as insurmountable, and a government that hasn't proven itself to be committed to the will of the American public. But when Washington began to meet the nation's needs at the conclusion of World War II, voter turnout increased, and continued to increase for the next three decades. It's time for us to signal to our fellow Americans that we are listening, and we will create solutions for our nation's challenges. It will not be easy, but we have to do this work. And together, through bipartisanship, we can turn this vision into reality.

Thank you. God bless you, and God bless the United States of America.

Pulling Off Desire

Teresa Mathew
From English 425, The Art of the Essay
(nominated by John Rubadeau)

In 39 years of teaching at the university level, the last 28 at Michigan, this is one of the best essays I have ever received. My prompt for my essays is "make the private public." I insist on the private being made public, because it avoids the writing of generic essays that are boring and, it gives the writer the opportunity to speak with a voice of authority about a topic which the audience can, perhaps, experience vicariously.

John Rubadeau

Pulling off Desire

It wouldn't take much to set my skin on fire.

All he'd have to do is touch me.

This sounds like the beginning of every harlequin romance cliché, where the virgin is touched for the first time and feels as if she's bursting into flames. But clichés exist for a reason, and I can only imagine that this one is as true as any other.

I'm twenty-one years old, and I've never been kissed. The closest I have ever come to having a sexual encounter with a boy (or girl, for that matter) is eye contact. I don't know what I would do if someone touched me as if he wanted me. Blush? Scream? Swoon?

I just can't fathom that anyone would ever want to want me. Want me desperately, as if he had no choice in the matter. As if I were something he needed under his skin even if he didn't fully like the idea. "Desperately." The word is ugly and haunting and beautiful because it reflects a kind of human need that I was conditioned to think I wasn't supposed to admit to. Before I came to Michigan, I had wanted things desperately—a dog, my mother's pride, an acceptance letter from Columbia—but never a living person, never a boy, never the feel of his hands, never the softness of his lips.

I've never known a damn thing about boys. I grew up with a brother who spent the majority of our adolescence ignoring me, and I went to an all-girl's Catholic high school where the only interaction I had with the opposite sex took place during speech and debate tournaments. The boys I was closest to before I came to college were Harry Potter and Ronald Weasley. Much like my experience with love, all my experience with boys came from book pages and well-crafted sentences. I had no idea how messy and frenetic and uncharted want would actually be. When I'm actually attracted to a boy I take every pain to hide it, because the only thing scarier than a boy thinking I have a crush on him would be for that boy to be correct.

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The romantic in me died this year—not from a dramatic firing squad of one-night stands or bad relationships but from a blood-deep exhaustion. As I edited photos of The Michigan Daily touch-football game late one Friday night and adjusted levels of lighting across the face of a boy—of The Boy I had been interested in on and off for the last year and a half—I felt a switch go on in my brain. I was always the good girl, the one who thought everything through and who could never imagine hooking up with a boy even if I was inexplicably, annoyingly, and decidedly more attracted to him than I had ever been to anyone else. But I was so, so tired of having to wait and want.

I had first seen him my freshman year as I sat at the photo desk in The Michigan Daily newsroom and wondered who the cute boy at the sports desk was and what he was like. Two and a half years later, at the end of my junior year, I could probably have counted the number of normal conversations we'd had on one hand despite late nights working less than ten feet apart and basketball road trips requiring fourteen hour car rides and walking together down unfamiliar sidewalks in unfamiliar cities while I looked at him sidelong and knew he would never notice.

Three months and four road trips of working with him while covering the Michigan men's basketball team should have made us closer, but the connection between us only ever went one way. I shouldn't have wanted him as much as I did, because I always tried my best to think with my brain, not my eyes—especially when it came to boys. But that didn't stop me from wanting him, the fluid arc of his arm when he threw a ball and the subtle strength when he caught it.

One night after covering a basketball game I sat on my bed in a hotel in Indianapolis and watched him turned slightly under his covers, watched the way grey cotton hugged and outlined his arms, and that want never felt like love but it did feel like poetry.

I didn't want to date The Boy in question. But I still wanted him, and

in a way that I didn't understand. I had never been as attracted to anyone as I was to him, to the blue of his eyes and soft sweep of his dirty-blond hair and the curves of his arms. I wanted a relationship that fell somewhere between dating and friendship. Something that I could hold in my hands even if I didn't think I could find a place for it in my heart.

"Do you think he could ever be interested in someone like me?" I stammered out the words as I sat in a car with a mutual friend, inquiring about The Boy because desperation had driven me to ask something I could not yet explain or put into words.

"Someone Indian?" my friend asked me with a sense of confusion I could hardly blame him for.

"No. Maybe. Yes?" I responded, just as confused. That was part of it; as an Indian-American girl, I had grown up believing that at best I would be something for white boys to exoticize: not to understand, not even to necessarily want, but to regard as strikingly other.

But that wasn't all, obviously. If it were, I could have honestly told my friend that, yes, I was curious if The Boy liked Indian girls. But it was more than that. It was my mother telling me my thighs were so fat that they offended her. It was staring at the stretch marks on my body and hearing her disapproving voice and never wanting those words to be echoed out loud by any man I wanted to want me. It was brushing the peach fuzz on my upper lip and lower back and wondering if it were possible for someone to touch me without feeling anything at all. And in that case, would apathy be better than disgust? Did the electricity of desire only go one way, and could it be stopped in its tracks by a scar, a bruise, or an errant hair?

But being undesirable didn't stop me from desiring, and there was no way to ask what I truly wanted to know. Was there any way a boy, that one or any other, could ever be interested in—not someone like me, but me? Could anyone see me as desirable? I can imagine myself in love, but my imagination stops short at any sort of reciprocity.

I sat in the backseat of a car on a seven-hour drive to Wisconsin, and, out of the corner of my eye, I found myself studying The Boy in the driver's seat. I was supposed to be making my way through Melville, but all I could think about was desire and how it was wreaking havoc on my mind and stomach. Because I got nervous just wanting. I wanted to touch his ridiculously long eyelashes and caress his tapered fingers, and I realized that everything I could bring myself to imagine stopped just short of being touched back.

I think that almost everyone is scared of putting him or herself out there; rejection is like a dragon you'd rather not have to go out of your way to slay. But I am scared of more than rejection; I am scared of disgust. I am scared of revulsion. I once wondered if I should bake cookies for The Boy if I kissed him, in order to apologize for the trouble of being kissed by me. And that's when I realized that I had a problem (because that sounds both pathetic and vaguely illegal). But after a lifetime of feeling that I was incapable of being desirable, it was a lesson that was neither quickly nor easily unlearned.

My mother has always made me feel as if I were all burned earth and overlarge pieces, an ungainly child and an unattractive woman. I know she loves me, but it often feels like she does so in a way I cannot understand. "You are a part of me," she has told me over and over again. "The things I say to you are what I wish people would tell me—who else is going to be honest with you except your mother?" She has made me fear honesty and mistrust compliments. Is she the only who holds the truth, and are the kind words my friends say to me just empty phrases born of pity? Perhaps that is why I crave desire as much as I feel I will never receive it. Because there is honesty, isn't there, in the spark of want, in the itching need to caress and the intense need for proximity?

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Late one Wednesday night, when an acquaintance at work started to whisper to me what she had done the previous weekend at Rick's, I could tell where her story was headed before she even said The Boy's name. Before she told me about flirtations and hooking up and an interest and a kindness and a *desire*

he had never shown me. I listened and nodded at the appropriate times, and, the moment I felt I could, I excused myself to call my friend Erin. I managed not to break down for a good fifteen minutes before sobbing, "I'm never going to be a pretty white girl," into her confused, loving ear.

It was an admission that startled me as well—was that what this was all about? Why was I so sure that no one would ever want me, physically or romantically? I was afraid of wanting, so afraid of showing want, because nothing terrified me more than coming so close to what I had craved so long and not only falling short but being pushed off the edge by a boy who wanted nothing to do with me. I wanted to protect myself, my hope, and my fragile pride.

I didn't feel as if my heart was breaking. But it felt as if something was splintering inside me all the same. And every time I saw them together, every piece of gossip someone told me about them, every time The Boy walked into the newsroom and didn't acknowledge my existence, it felt as if there were rubber bands snapping across something soft inside of me that I had never intended to make so vulnerable. *You didn't pick me*. The words came with jagged edges. *And who is to say anyone ever will?*

I wanted him to want me. Sometimes it felt as if I would unravel from that desire, from not understanding why my presence in his life didn't have a tenth of the frenetic pull that his did in mine. I needed, just once, to know what it felt like to have someone not only not fear but actually crave my fire.

He never has been and he never will be interested in you, and you probably shouldn't try to psychoanalyze why I told myself sternly. People probably think that if they could change just one aspect of themselves they would become attractive to the object of their desires. But being a person of color often adds another complicated layer. It can make someone feel undeniably "other." For me, it adds one more barrier for someone to break down before getting to my thoughts, my mind, my heart. I always thought that boys who weren't Indian could never view me in terms of attraction—I could be seen and even liked as a friend or a co-worker, but never seen as an object of desire. I felt as if brown

were the color of invisibility, and I tried to tell myself that want wasn't worth the anguish and frustration. I tried to believe that, no matter the reason, I should let it—desire and the want to be wanted—go.

But desire never dissipates just because you want it to.

A week later, my twenty-first birthday found me at Charley's on karaoke night, standing next to The Boy by the bar and waiting for our turn to sing Shania Twain's seminal classic "Man I Feel Like a Woman" (a duet we had done completely sober on the road home from Wisconsin after covering a basketball game). I was eight shots in, and, as a girl who had never been drunk before, I couldn't tell if my thoughts were surfacing because of the alcohol or born completely of it. I turned around to face The Boy, about to ask when he thought we would be up, and, for one fleeting moment, all that ran through my mind was *I could kiss you right now, and I really, really want to* before the part of my mind that never fully lets me lose control tacked on *if someone else wasn't interested in you. And if you weren't interested in her. And if you weren't completely uninterested in me*. Some Music, Theater, and Dance students were singing "Don't Stop Believing," and I wanted to tell them that I should probably stop doing just that, though I appreciated their support.

I tell myself that I am made of fire, yet I have always been so afraid of getting burned. But burned by what, exactly? The Boy's rejection? Or my own myriad fears and insecurities which would inevitably come with it? The Boy, like me, is flawed and only human. He cannot decide my self-worth or desirability. And I need to realize that no one has the right to do so. Not all of the light-starved, want-starved, love-starved parts of me can be both fed and illuminated by my own fire. But I need to stop blaming myself for that. I shouldn't try and evade desire because I don't think I'm worthy. I am worthy, and someday this electricity will be a two-way street. If someone doesn't want me, then so be it. I'll still have my fire, and they can avoid getting burned. I should not have to let want go.

Because I am tired of thinking of people in capital letters and having

them look at me with eyes that make it clear that, to them, I am no more than a single lowercase phrase. Waiting is hard and a little painful because, even though I have very little idea of what I'm missing out on, my imagination never hesitates to fill in the blanks of what could be if I was a little braver, a little prettier, a lot more able to imagine that someone will someday want me. But I *will* wait, in the hopes that, someday, I will be able to pull off desire with my needy fingers and full-to-bursting heart and know, no matter the outcome, that I am worthy of love and want and wanting.

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